Permit Fact Sheet

General Information

Permit Number	WI-0060151-10-0
Permittee Name and Address	VILLAGE OF AVOCA PO Box 188, 401 Wisconsin Street Avoca, WI 53506-0188
Permitted Facility Name and Address	Avoca Wastewater Treatment Facility Lagoon Road, NWQ, NEQ, SEC 11, T8N, R1E, Pulaski Township, Avoca, Wisconsin
Permit Term	April 01, 2025 to March 31, 2030
Discharge Location	East Bank of Morrey Creek approximately ½ mile north of Highway Bridge, Lat: 43.19014°N Long: 90.34113°W
Receiving Water	Morrey Creek in Otter and Morrey Creeks of Wisconsin River (lower) in Iowa county
Stream Flow ($Q_{7,10}$)	1.4 cfs
Stream Classification	Warm water sport fishery, non-public water supply
Discharge Type	Existing, Continuous
Annual Average Design Flow (MGD)	0.064 MGD
Industrial or Commercial Contributors	None
Plant Classification	A3 - Recirculating Media Filters; D - Disinfection; SS - Sanitary Sewage Collection System. The facility will have 1 year after construction of the planned upgrade is complete to have an operator fully certified subclass P per s. NR 114.53 (4), Wis. Adm. Code.
Approved Pretreatment Program?	N/A

Facility Description

The Village of Avoca operates a recirculating sand filter biological wastewater treatment facility. The facility is in the north-west side of Avoca in Pulaski Township in Iowa County and serves an estimated population of 550. There are no contributing industrial facilities to the sanitary sewer besides bars and restaurants. Treatment is provided with headworks (screening, installed in 2021), a two-train septic tank that has three stages, a "dosing" (recirculation) tank, and four sand filter beds with underdrains. Effluent is discharged to Morrey Creek year-round and disinfected using ultraviolet radiation from May through September. Solids are removed from the septic tank once every two to five years as needed. Plans and specifications for a chemical addition upgrade were conditionally approved October 10, 2024.

Substantial Compliance Determination

Enforcement During Last Permit: The Notice of Noncompliance (NON) issued August 20, 2021, and Notice of Violation (NOV) issued June 1, 2022, alleged phosphorus variance requirement violations. The facility has completed all

previously required actions as part of the enforcement process and conditional approval of the proposed upgrade with chemical addition (Project Number: S-2023-0814) was granted October 10, 2024.

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on September 28, 2023, this facility has been found to be in substantial compliance with their current permit.

Substantial compliance determination made by Kenzie Ostien on October 9, 2023

Sample Point Descriptions

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
701	0.024 MGD (1/1/2019 – 6/30/2024)	INFLUENT: 24-hour flow proportional composite samples shall be collected before the head of the septic tank. Flow is monitored in the force main before the headworks.
002	0.027 MGD (1/1/2019 – 6/30/2024)	EFFLUENT: 24-hour flow proportional composite samples shall be collected at the splitter box, prior to discharge. Grab samples shall be collected in the effluent channel post disinfection. Flow is monitored in the splitter box chamber prior to the V notch weirs.
901	N/A	Solids from the septic tank of the Recirculating Sand Filter WWTF.

Permit Requirements

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 701- INFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total		mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	2/Week	24-Hr Flow Prop Comp	

1.1.1 Changes from Previous Permit:

Influent limitations and monitoring requirements were evaluated for this permit term and the following changes were made to the proposed permit:

Flow- The sample frequency for flow has been changed from “continuous” to “daily” for eDMR reporting purposes.

1.1.2 Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD5 and total suspended solids is required by s. NR 210.04(2), Wis. Adm. Code, to assess wastewater strengths and volumes and to demonstrate the percent removal requirements in s. NR 210.05, Wis. Adm. Code, and in the Standard Requirements section of the permit.

2 Surface Water - Monitoring and Limitations

2.1 Sample Point Number: 002- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Weekly Avg	23 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective May - October.
BOD5, Total	Weekly Avg	45 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective November-April
BOD5, Total	Monthly Avg	23 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective May-October.
BOD5, Total	Monthly Avg	30 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective November-April.
Suspended Solids, Total	Weekly Avg	23 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective May-October.
Suspended Solids, Total	Weekly Avg	45 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective November-April.
Suspended Solids, Total	Monthly Avg	23 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective May-October.
Suspended Solids, Total	Monthly Avg	30 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective November-April.
pH Field	Daily Min	6.0 su	5/Week	Grab	
pH Field	Daily Max	9.0 su	5/Week	Grab	
Dissolved Oxygen	Daily Min	6.0 mg/L	5/Week	Grab	
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	29 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective in April.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	35 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective May-September.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	42 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective October-March.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	14 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective in April.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	18 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective May-September.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	22 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective October-March.
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Limit effective May-September.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Limit effective May-September. See the E. coli Percent Limit section. Enter the result in the DMR on the last day of the month.
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring only in 2028.
Phosphorus, Total	Monthly Avg	7.3 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective throughout the permit term, as it represents a minimum control level.
Phosphorus, Total		lbs/day	2/Week	Calculated	Report daily mass discharged using Equation 1a in the Water Quality Trading (WQT) section.
WQT Credits Used (TP)		lbs/month	Monthly	Calculated	Report WQT TP Credits used per month using Equation 2c in the Water Quality Trading (WQT) section. Available TP Credits are specified in Table 2 and in the approved Water Quality Trading Plan.
WQT Computed Compliance (TP)	Monthly Avg	0.225 mg/L	Monthly	Calculated	Limit effective November 1, 2025. Report the WQT TP Computed Compliance value using Equation 3a in the Water Quality Trading (WQT) section. Value entered on the last day of the month.
WQT Computed Compliance (TP)	6-Month Avg	0.075 mg/L	Monthly	Calculated	Limit effective November 1, 2025. Compliance with the six-month average limit

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					is evaluated at the end of the six-month period on June 30 and December 31.
WQT Computed Compliance (TP)	6-Month Avg	0.04 lbs/day	Monthly	Calculated	Limit effective November 1, 2025. Report the WQT TP Computed Compliance value using Equation 3b in the Water Quality Trading (WQT) section. Compliance with the six-month average limit is evaluated at the end of six-month period on June 30 and December 31.
WQT Credits Used (TP)	Annual Total	32 lbs/yr	Annual	Calculated	Available for 2025 only. The sum of total monthly credits used may not exceed Table 2 values listed in permit.
WQT Credits Used (TP)	Annual Total	192 lbs/yr	Annual	Calculated	Effective starting in 2026. The sum of total monthly credits used may not exceed Table 2 values listed in permit.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrate + Nitrate Nitrogen.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET Testing section in permit.
Chronic WET		TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET Testing section in permit.

2.1.1 Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under "Explanation of Limits and Monitoring Requirements" below.

Flow- The sample frequency for flow has been changed from "continuous" to "daily" for eDMR reporting purposes.

pH – Sample frequency was increased from 2x/week to 5x/week.

Dissolved Oxygen – Sample frequency was increased from 2x/week to 5x/week.

E. coli- Fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits.

Total Nitrogen Monitoring (TKN, N02+N03 and Total N)- Annual monitoring is required in specific quarters as outlined in the permit.

Total Phosphorus – Water Quality Trading (WQT) requirements have been added as the permittee has chosen WQT for compliance with phosphorus limits.

Whole Effluent Toxicity (WET) – Acute and chronic WET monitoring three times during the permit term was added to the proposed permit.

Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated November 11, 2024.

BOD5, Total Suspended Solids, pH, and Dissolved Oxygen: Standard municipal wastewater requirements for BOD5, total suspended solids, dissolved oxygen, and pH are included based on ch. NR 210, Wis. Adm. Code 'Sewage Treatment Works' requirements for discharges to fish and aquatic life streams. Chapter NR 102, Wis. Adm. Code 'Water Quality Standards for Surface Waters' also specifies requirements for pH for fish and aquatic life streams.

Ammonia- Current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Tables 2C and 4B of ch. NR 105, Wis. Adm. Code. Subchapter IV of ch. NR 106 establishes the procedure for calculating water quality-based effluent limitations (WQBELs) for ammonia.

E. Coli- Revisions to bacteria surface water quality criteria to protect recreational uses and accompanying E. coli WPDES permit implementation procedures became effective May 1, 2020. The new rule requires that WPDES permits for facilities with required disinfection include monitoring for E. coli while facilities are disinfecting during the recreation period and establish effluent limitations for E. coli established in s. NR 210.06 (2), Wis. Adm Code. The administrative code rule changes included the following actions: revised the bacteria water quality criteria from fecal coliform to E. coli to protect recreation in ch. NR 102, Wis. Adm. Code.; removed fecal coliform criteria for certain individual waters from ch. NR 104, Wis. Adm. Code.; revised permit requirements for publicly and privately owned sewage treatment works in ch. NR 210, Wis. Adm. Code.; and, updated approved analytical methods for bacteria in ch. NR 219, Wis. Adm. Code.

Phosphorus – Phosphorus requirements are based on the Phosphorus Rules that became effective December 1, 2010 as detailed in NR 102 Water Quality Standards and NR 217 Effluent Standards and Limitations for Phosphorus. Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. Currently in NR 217 Wis. Adm. Code there are two methods used to determine if a phosphorus limit is needed: a technology based effluent limit (TBEL) and a water quality-based effluent limit (WQBEL). Based on the size and classification of the stream, the water quality criteria for Morrey Creek is 0.075 mg/L. In this case, the WQBEL is 0.225 mg/L (monthly average), 0.075 mg/L & 0.04 lbs/day (6-month average). For the reasons explained in the April 30, 2012, paper entitled 'Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin', WDNR has determined that it is impracticable to express the phosphorus WQBEL for the permittee as a maximum daily, weekly or monthly value. The final effluent limit for phosphorus is expressed as a six-month average. It is also expressed as a monthly average equal to three times the derived WQBEL (which equates to 0.3 mg/L). This final effluent limit was derived from and complies with the applicable water quality criterion. A phosphorus

concentration limit is necessary to prevent backsliding during the term of the permit. A limit of 7.3 mg/L as a monthly average will be retained in the permit as a minimum level of control.

The wastewater treatment facility is not able to meet the WQBEL. This permit authorizes the use of trading as a tool to demonstrate compliance with the phosphorus WQBELs. This permit includes terms and conditions related to the Water Quality Trading Plan (WQT-2024-0024) or approved amendments thereof. The total 'WQT TP Credits' available are designated in the approved WQT Plan. The Village of Avoca is installing streambank stabilization which will utilize grading and vegetation establishment to prevent erosion of sediment from the streambanks of Morrey Creek. The WQT Plan proposes generation of 192 lbs/yr of phosphorus credits for the next five years. The WQT project is expected to be completed in 2025, therefore, available credits in 2025 (32 lbs/yr) are prorated based on the anticipated completion timeframe.

Additional WQT subsections in the permit provide information on compliance determinations, annual reporting and re-opening of the permit.

Total Nitrogen Monitoring (NO2+NO3, TKN and Total N) - The Department has included effluent monitoring for Total Nitrogen in the permit through the authority under §§ 283.55(1)(e), Wis. Stats., which allows the department to require the permittee to submit information necessary to identify the type and quantity of any pollutants discharged from the point source, and through s. NR 200.065(1)(h), Wis. Adm. Code, which allows for this monitoring to be collected during the permit term. More information on the justification to include total nitrogen monitoring in wastewater permits can be found in the "Guidance for Total Nitrogen Monitoring in Wastewater Permits" dated October 1, 2019. Annual tests are scheduled for the following quarters: October-December 2025, April-June 2026, January-March 2027, July-September 2028, April-June 2029

WET Testing – Whole effluent toxicity (WET) testing requirements and limits are determined in accordance with ss. NR 106.08 and NR 106.09 Wis. Adm. Code, as revised August 2016. (see the current version of the Whole Effluent Toxicity Program Guidance Document and checklist and WET information, guidance and test methods at http://dnr.wi.gov/topic/wastewater/wet.html) As noted in the November 11, 2024, WQBEL memo, no reasonable potential for acute or chronic whole effluent toxicity is shown, and therefore limits are not required. Acute and chronic WET tests are scheduled for the following quarters: October-December 2025, January-March 2027, and April-June 2029.

Monitoring Frequencies- The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. The department determined that an increase in monitoring frequency for pH and dissolved oxygen to 5x/Week is appropriate to remain consistent with facilities of similar size and effluent quality across the state. An additional consideration for increasing sample frequency for process control parameters such as pH and dissolved oxygen is that they are tested in-house, can quickly provide information on how well a treatment system is performing, and can help identify potential compliance issues. The increased monitoring frequency also ensures better calibration of sampling equipment, improves data reliability, and ensures more frequent operator oversight of the treatment plant.

3 Septage Management - Monitoring and Limitations

Septage management is required in accordance ch. NR 113, Wisconsin Administrative Code. Records must be kept and made available to the Department on request. Required record keeping includes volumes of septage pumped, dates when the septage was removed, land application site DNR number and method used to satisfy pathogen and vector control, and/or the treatment plant where septage is disposed. Annual reporting is required when the permittee land applies the septage. Annual reporting is also required when the permittee disposes of septage at a designated treatment facility.

3.1 Sample Point Number: 901- SEPTIC TANK

3.1.1 Changes from Previous Permit:

No changes from previous permit.

Explanation of Limits and Monitoring Requirements

Requirements for septage management are determined in accordance with ch. NR 113, Wis. Adm. Code.

4 Schedules

4.1 Annual Water Quality Trading (WQT) Report

Required Action	Due Date
Annual WQT Report #1: Submit an annual WQT report that shall cover the first year of the permit term. The WQT Report shall include: The number of pollutant reduction credits (lbs/month) used each month of the previous year to demonstrate compliance; The source of each month's pollutant reduction credits by identifying the approved water quality trading plan that details the source; A summary of the annual inspection of each nonpoint source management practice that generated any of the pollutant reduction credits used during the previous year; and Identification of noncompliance or failure to implement any terms or conditions of this permit with respect to water quality trading that have not been reported in discharge monitoring reports.	01/31/2026
Annual WQT Report #2: Submit an annual WQT report that shall cover the previous year.	01/31/2027
Annual WQT Report #3: Submit an annual WQT report that shall cover the previous year.	01/31/2028
Annual WQT Report #4: Submit an annual WQT report that shall cover the previous year.	01/31/2029
Revised WQT Plan: If the permittee wishes to continue to comply with phosphorus limits through WQT in subsequent permit terms, the permittee shall submit a revised WQT plan including a demonstration of credit need, compliance record of the existing WQT, and any additional practices needed to maintain compliance over time.	09/30/2029
Annual WQT Report #5: Submit an annual WQT report that shall cover the previous year.	01/31/2030
Annual WQT Report Required After Permit Expiration: In the event that this permit is not reissued by the expiration date, the permittee shall continue to submit annual WQT reports by January 31 each year covering the total number of pollutant credits used, the source of the pollution reduction credits, a summary of annual inspection reports performed, and identification of noncompliance or failure to implement any terms or conditions of the approved water quality trading plan for the previous calendar year.	

4.1.1 Explanation of Schedule

Reports are required that include the following information:

• Verification that site inspections occurred;

• Results of site inspection findings;

• Identification of noncompliance or failure to implement any terms or conditions of the permit or trading plan that have not been reported in discharge monitoring reports;

• Any applicable notices of termination or management practice registration; and

• A summary of credits used each month over the calendar year

Attachments

Water Quality-Based Effluent Limitations for the Avoca Wastewater Treatment Facility WPDES Permit No. WI-0060151-10-0, dated November 11, 2024 and prepared by Zainah Masri

Water Quality Trading Plan (WQT-2024-0024), dated August 9, 2024

Water Quality Trading Plan Conditional Approval Letter, dated October 31, 2024

Justification Of Any Waivers From Permit Application Requirements

No waivers requested or granted as part of this permit reissuance.

Prepared By: Lisa Creegan, Wastewater Specialist

Date: January 20, 2025

Date (post fact check): February 14, 2025

Date (post public notice):

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: November 11, 2024

TO: Lisa Creegan – SER/Milwaukee

FROM: Zainah Masri – WY/3

SUBJECT: Water Quality-Based Effluent Limitations for the Avoca Wastewater Treatment Facility
WPDES Permit No. WI- 0060151-10-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Avoca Wastewater Treatment Facility in Iowa County. This municipal wastewater treatment facility (WWTF) discharges to Morrey Creek, located in the Otter-Morrey Creek Watershed in the Lower Wisconsin River Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 002:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
BOD_5 May – October November – April			 23 mg/L 45 mg/L	 23 mg/L 30 mg/L		1
TSS May – October November – April			 23 mg/L 45 mg/L	 23 mg/L 30 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		6.0 mg/L				1
Ammonia Nitrogen April May – September October– March	 - - -		 29 mg/L **35 mg/L** **42 mg/L**	 14 mg/L 18 mg/L 22 mg/L		1,5
Bacteria						
E. coli				126 #/100 mL geometric mean		3
Chloride						4
Phosphorus						6
Final				0.225 mg/L	0.075 mg/L 0.04 lbs/day	
TKN, Nitrate+Nitrite, and Total Nitrogen						7
Acute WET						8
Chronic WET						9

Footnotes:

1. No changes from the current permit.

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2. Monitoring only.
3. Bacteria limits apply during the disinfection season of May through September. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
4. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
5. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
6. In accordance with s. NR 217.15(1), Wis. Adm. Code, there is reasonable potential for the discharge to cause or contribute to an exceedance of the water quality criteria. Therefore, continuation of the WQBEL is required.
7. As recommended in the Department's October 1, 2019, Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total kjeldahl nitrogen (TKN) (all expressed as N).
8. Three acute whole effluent toxicity (WET) tests are recommended during the reissued permit term. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued). <u>If a satisfactory phosphorus chemical SOP is established and implemented at the facility prior to permit reissuance, then WET testing is not required in the reissued permit.</u>
9. Three chronic whole effluent toxicity (WET) tests are recommended during the reissued permit term. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued). <u>If a satisfactory phosphorus chemical SOP is established and implemented at the facility prior to permit reissuance, then WET testing is not required in the reissued permit.</u>

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Zainah Masri at Zainah.Masri@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (4) – Narrative, Ammonia Nitrogen Calculations, Map and Thermal Table

PREPARED BY: Zainah Masri, Senior Water Resource Engineer Zainah Masri

APPROVED BY: Diane Figiel Date: 11/11/2024
Diane Figiel, PE
Water Resources Engineer

E-cc: Kenzie Ostien, Wastewater Engineer – SCR/Fitchburg
Adebowale Adesanwo, Wastewater Engineer – WY/3
Diane Figiel, Water Resources Engineer – WY/3
Kari Fleming, NR Section Manager – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for
Avoca Wastewater Treatment Facility

WPDES Permit No. WI-00– 0060151-10-0

Prepared by: Zainah Masri

PART 1 – BACKGROUND INFORMATION

Facility Description:
The Village of Avoca operates a recirculating sand filter biological wastewater treatment facility. The facility is located in the north-west side of Avoca in Pulaski Township in Iowa County and serves an estimated population of 550. There are no contributing industrial facilities to the sanitary sewer besides bars and restaurants. Treatment is provided with headworks (screening) (installed in 2021), a two-train septic tank that has three stages, a "dosing" (recirculation) tank, and a four sand filter beds with underdrains. Effluent is discharged to Morrey Creek year-round and disinfected using ultraviolet radiation from May through September. Solids are removed from the septic tank once every two to five years as needed. Plans and specifications for a chemical addition upgrade were conditionally approved October 10, 2024.

Attachment #2 is a map of the area showing the approximate location of Outfall 002.

Existing Permit Limitations
The current permit, which expired on June 30, 2024, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						2
BOD_5 May – October November – April			 23 mg/L 45 mg/L	 23 mg/L 30 mg/L		1
TSS May – October November – April			 23 mg/L 45 mg/L	 23 mg/L 30 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		6.0 mg/L				1
Ammonia Nitrogen April May – September October– March			 29 mg/L **35 mg/L** **42 mg/L**	 14 mg/L 18 mg/L 22 mg/L		1,4
Fecal Coliform May – September			**656#/100 mL** **geometric mean**	400#/100 mL geometric mean		4
Chloride						3

Attachment #1

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Phosphorus Interim Final				 7.3 mg/L 0.225 mg/L	 0.075 mg/L 0.04 lbs/day	5

Footnotes:

1. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
2. Monitoring only
3. Monitoring only in 2023.
4. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
5. A phosphorus interim limit of 7.3 mg/L was effective upon permit reissuance. A compliance schedule was included in the permit to meet the final WQBELs which became effective January 31, 2024.

Receiving Water Information

- Name: Morrey Creek
- Waterbody Identification Code (WBIC): 1220000
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code:
  The following 7-Q_{10} and 7-Q_2 values are from USGS based on flow information for Morrey Creek, PLSS; NE ¼ of NW ¼ of Section 11, T8N-R1E, where Outfall 002 is located.
  7-Q_{10} = 1.4 cfs (cubic feet per second)
  7-Q_2 = 2.1 cfs (previously estimated using 7-Q_2/7-Q_{10} ratio at Saunders Creek at Boscobel =1.5)
  Harmonic Mean Flow = 5.0 cfs using a drainage area of 17.5 mi^2
  The Harmonic Mean has been estimated based on average flow and the 7-Q_{10} using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).
- Hardness = 300 mg/L as $CaCO_3$. This value represents the geometric mean of data from 2007 WET test data.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%
- Source of background concentration data: No site specific metals data from Morrey Creek is used for this evaluation The metals data from the Wisconsin River below the power plant dam in the Wisconsin Dells (SWIMS ID: 573052) is used. The Wisconsin River is within the same ecological landscape so ambient water quality characteristics are expected to be similar. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: None
- Impaired water status: Impaired for contaminated sediment 1.6 miles downstream point of discharge.

Effluent Information

- Design flow rate:
  Annual average = 0.064 MGD (Million Gallons per Day)
  For reference, the actual average flow from January 2019 to June 2024 was 0.03 MGD.
- Hardness = 315 mg/L as $CaCO_3$. This value represents the geometric mean of four results from November 2023 to December 2023 which were reported on the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water source: Domestic wastewater with water supply from wells.
- Additives: Alum for Phosphorus removal
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus ammonia, chloride, hardness, and phosphorus.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Effluent Copper Data

Sample Date	Copper µg/L	Sample Date	Copper µg/L	Sample Date	Copper µg/L
11/1/2023	35	11/13/2023	50	11/25/2023	42
11/4/2023	46	11/16/2023	42	11/28/2023	49
11/7/2023	71	11/19/2023	48	12/1/2023	46
11/10/2023	55	11/22/2023	45		
1-day P_{99} = 73 µg/L					
4-day P_{99} = 60 µg/L					

Effluent Chloride Data

Sample Date	Chloride mg/L	Sample Date	Chloride mg/L	Sample Date	Chloride mg/L
2/13/2023	134	5/4/2023	114	9/7/2023	123
3/1/2023	115	6/7/2023	130	10/2/2023	105
3/20/2023	118	7/6/2023	134	11/6/2023	167
4/3/2023	104	8/3/2023	115	12/4/2023	122
1-day P_{99} = 168 mg/L					
4-day P_{99} = 144 mg/L					

The following table presents the average concentrations and loadings at Outfall 002 from January 2019 to June 2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

	Average Measurement	Average Mass Discharged
BOD_5	2.54 mg/L*	
TSS	2.3 mg/L*	
pH field	6.6 s.u.	
Phosphorus	5.9 mg/L	1.33 lbs/day
Ammonia Nitrogen	1.82 mg/L*	

*Results below the level of detection (LOD) were included as zeroes in calculation of average.

PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P_{99}) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q_{10}

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q_{10} receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

$$\text{Limitation} = \frac{(WQC)\,(Qs + (1-f)\,Qe) - (Qs - f\,Qe)\,(Cs)}{Qe}$$

Where:

WQC =Acute toxicity criterion or secondary acute value according to ch. NR 105, Wis. Adm. Code.

Qs = average minimum 1-day flow which occurs once in 10 years (1-day Q_{10}) if the 1-day Q_{10} flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q_{10}).

Qe = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

Cs = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q_{10} method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for Avoca Wastewater Treatment Facility and the limits are set based on two times the acute toxicity criteria.

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling for all the detected substances.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 1.12 cfs, (1-Q_{10} (estimated as 80% of 7-Q_{10})), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Arsenic		19	679.6	135.9	1.4		
Cadmium	315	38.4	76.9	15.4	<0.19		
Chromium	301	4446	8891.7	1778	1.3		
Copper	315	45.8	91.6			73	71
Lead	315	324	648	129.6	<4.3		
Nickel	268	1080	2160.6	432	3		
Zinc	315	328	656.7	131.3	16		
Chloride (mg/L)		757	1514			168	167

* The indicated hardness may differ from the effluent hardness because the effluent hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the acute criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

* * The 2 × ATC method of limit calculation yields a more restrictive limit than consideration of ambient concentrations and 1-Q_{10} flow rates per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0.35 cfs (¼ of the 7-Q_{10}), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Arsenic		152	0.78	687	137.5	1.4	
Cadmium	175	3.8	0.006	17.3	3.5	<0.19	
Chromium	300	325	0.412	1472	294	1.3	
Copper	300	26.5	0.76	118			60
Lead	300	81	0.075	367	73.4	<4.3	
Nickel	268	120.2	1.19	541	108	3	
Zinc	300	314.6	0.43	1425	285	16	
Chloride (mg/L)		395	14.4	1740			144

* The indicated hardness may differ from the receiving water hardness because the receiving water hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the chronic criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

Monthly Average Limits based on Wildlife Criteria (WC)
The effluent characterization did not include any effluent sampling results for substances for which Wildlife Criteria exist.

Monthly Average Limits based on Human Threshold Criteria (HTC)
RECEIVING WATER FLOW = 1.25 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	0.006	5040	1008	<0.19
Chromium (+3)	3818000	0.41	52012788	10402558	1.3
Lead	140	0.075	1906	381.3	<4.3
Nickel	43000	1.19	585776	117155	3

Monthly Average Limits based on Human Cancer Criteria (HCC)
RECEIVING WATER FLOW = 1.25 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3	0.78	171.4	34.3	1.4

Conclusions and Recommendations
Based on a comparison of the effluent data and calculated effluent limitations, **no effluent limitations are required.**

Chloride – Considering available effluent data from the DMR from January 2019 to June 2023 the 1-day P_{99} chloride concentration is 168 mg/L, and the 4-day P_{99} of effluent data is 144 mg/L.

These effluent concentrations are below the calculated WQBELs for chloride; **therefore no effluent limits are needed**. **Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.**

Mercury – The permit application did not require monitoring for mercury because Avoca Wastewater Treatment Facility is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3., Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, "there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5)." However, sludge sampling is not available because Avoca Wastewater Treatment Facility is a recirculating sand filter and generates solids which are hauled away as septage. It is not expected that there are exceedances of the high-quality mercury concentration based on similar municipal treatment plants and the lack of industries. **No monitoring is recommended.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. the type of discharge, the effluent flow rate, the types of indirect dischargers

contributing to the collection system, and the available PFOS/PFOA monitoring data, **PFOS and PFOA monitoring is not recommended at this time.** The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. The current permit has weekly average and monthly average limits. These limits are re-evaluated at this time due to the following changes:

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)
Daily maximum limitations are based on acute toxicity criteria in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation:

$$\text{ATC in mg/L} = [A \div (1 + 10^{(7.204 - pH)})] + [B \div (1 + 10^{(pH - 7.204)})]$$

Where:

A = 0.411 and B = 58.4 for a Warm Water Sport fishery, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 539 sample results were reported from January 2019 to June 2024. The maximum reported value was 7.16 s.u. (Standard pH Units). The effluent pH was 7.02 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 6.92 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 6.92 s.u. Therefore, a value of 6.62 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 6.92 s.u. into the equation above yields an ATC = 38.5 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method
In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are calculated using the 1-Q_{10} receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q_{10} (estimated as 80 % of 7-Q_{10}) and the 2×ATC approach are shown below.

Attachment #1

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	77
1-Q_{10}	474.3

The 2×ATC method yields the most stringent limits for Avoca Wastewater Treatment Facility.

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)
The weekly and monthly average ammonia nitrogen limits calculation from the previous memo do not change because there have been no changes in the effluent or receiving water flow rates. The calculations from the previous WQBEL memo are shown in Attachment #2.

Effluent Data
The following table evaluates the statistics based upon ammonia data reported from January 2019 – June 2024 with those results being compared to the calculated limits to determine the need to include ammonia limits in the Avoca Wastewater Treatment Facility permit for the respective month ranges. That need is determined by calculating 99th upper percentile (or P_{99}) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.

Based on this comparison, **daily maximum effluent limits are not required**.

Ammonia Nitrogen Effluent Data

Ammonia Nitrogen mg/L	April	May - September	October - March
1-day P_{99}	11.8	1.6	17.2
4-day P_{99}	6.5	0.9	9.8
30-day P_{99}	3.71	0.45	6.08
Mean	2.53	0.28	4.42
Std	2.39	0.33	3.42
Sample size	48	107	237
Range	0.09 - 9.99	0.016 - 2.06	0.07 - 17.4

The permit currently has weekly and monthly average limits year round. Where there are existing ammonia nitrogen limits in the permit, the limits must be retained regardless of reasonable potential, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

> (b) If a permittee is subject to an ammonia limitation in an existing permit, the limitation shall be included in any reissued permit. Ammonia limitations shall be included in the permit if the permitted facility will be providing treatment for ammonia discharges.

Conclusions and Recommendations
In summary, after rounding to two significant figures, the following ammonia nitrogen limitations are recommended. No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. Adm Code.

Final Ammonia Nitrogen Limits

	Weekly Average mg/L	Monthly Average mg/L
April	29	14
May – September	35	18
October – March	42	22

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

On May 1, 2020, revisions to chs. NR 102 and NR 210, Wis. Adm. Codes, became effective which replace fecal coliform limits with new *Escherichia coli* (*E. coli*) limits for protection of recreational uses. Section NR 210.06(2)(a)1, Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect:

1. The geometric mean of *E. coli* bacteria in effluent samples collected in any calendar month may not exceed 126 counts/100 mL.
2. No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 counts/100 mL.

E. coli monitoring is recommended at the same frequency that fecal coliform monitoring is required in the current permit. Because Avoca Wastewater Treatment Facility permit requires weekly monitoring, the 410 counts/100 mL limit will effectively function as a daily maximum limit unless the facility performs additional monitoring. Any additional monitoring beyond what is required by the permit must also be reported on the DMR as required in the standard requirements section of the permit.

These limits are required during May through September. No changes are recommended to the current recreational period and the required disinfection season.

Effluent Data

Avoca Wastewater Treatment Facility has monitored effluent *E. coli* from May 2022 to September 2022 and a total of five sample results are available. A geometric mean of 126 counts/100 mL was exceeded in two out of the last five months, with a maximum monthly geometric mean of 160 counts/100 mL. Effluent data has not exceeded 410 counts/100 mL The maximum reported value was 160 counts/100 mL. Based on this effluent data it appears that the facility can meet new *E. coli* limits and a compliance schedule is not needed in the reissued permit.

PART 5 – PHOSPHORUS

Technology-Based Effluent Limit

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of Total Phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

Because Avoca Wastewater Treatment Facility currently has a more restrictive WQBELs in effect, the need for this limit in the reissued permit is not evaluated.

Water Quality-Based Effluent Limits (WQBEL)
Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to s. NR 102.06, Wis. Adm. Code, which establish phosphorus standards for surface waters. Subchapter III of NR 217, Wis. Adm. Code, establishes procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

Section NR 102.06(3)(a), Wis. Adm. Code, specifically names river segments for which a phosphorus criterion of 0.100 mg/L applies. For other stream segments that are not specified in s. NR 102.06(3)(a), Wis. Adm. Code, s. NR 102.06(3)(b), Wis. Adm. Code, specifies a phosphorus criterion of 0.075 mg/L. The phosphorus criterion of 0.075 mg/L applies for Morrey Creek.

The conservation of mass equation is described in s. NR 217.13(2)(a), Wis. Adm. Code, for phosphorus WQBELs and includes variables of water quality criterion (WQC), receiving water flow rate (Qs), effluent flow rate (Qe), and upstream phosphorus concentrations (Cs) provided below.

$$\text{Limitation} = [(WQC)(Qs+(1-f)\ Qe) - (Qs-fQe)\ (Cs)]/Qe$$

Where:

WQC = 0.075 mg/L for Morrey Creek.
Qs = 100% of the 7-Q_2 of 2.1 cfs
Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code
Qe = effluent flow rate = 0.064 MGD = 0.099 cfs
f = the fraction of effluent withdrawn from the receiving water = 0

Section NR 217.13(2)(d), Wis. Adm. Code, specifies that the background phosphorus concentration used in the limit calculation formula shall be calculated as a median using the procedures specified in s. NR 102.07(1)(b) to (c), Wis. Code. All representative data from the most recent 5 years shall be used, but data from the most recent 10 years may be used if representative of current conditions.

A previous evaluation resulted in a WQBEL of 0.075 mg/L using a background concentration of 0.123 mg/L. Section NR 217.13(2)(d), Wis. Adm. Code, states that the determination of upstream concentrations shall be evaluated at each permit reissuance. No additional data were available for updated consideration in estimating the background phosphorus concentration.

In stream total phosphorus data upstream of the discharge is not available however the following data were considered in estimating the background phosphorus concentration:

Attachment #1

SWIMS ID	253192	10012232
Station Name	HWY 133	Otter Creek at Hwy C
Waterbody	Morrey Creek	Otter Creek
Sample Count	1	14
First Sample	08/05/2011	05/02/2006
Last Sample	08/05/2011	09/27/2009
Mean	0.093	0.141
Median	0.093	0.115
NR 217 Median	Insufficient Data	0.123

Substituting a background concentration above criteria into the limit calculation equation above would result in a calculated limit that is less than the applicable criterion of 0.075 mg/L. However, s. NR 217.13(7), Wis. Adm. Code, specifies that "if the WQBEL calculated pursuant to the procedures in this section is less than the phosphorus criterion specified in s. NR 102.06, Wis. Adm. Code, for the water body, the effluent limit shall be set equal to the criterion."

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from January 2019 to June 2024 and from January 2024 to June 2024, when the WQBEL went into effect.

Total Phosphorus Effluent Data

	Phosphorus mg/L prior to limit	**Phosphorus mg/L after limit went into effect**
1-day P_{99}	10.5	6.9
4-day P_{99}	8.0	6.2
30-day P_{99}	6.66	5.72
Mean	5.97	5.48
Std	1.56	0.56
Sample size	478	48
Range	0.52 - 11.03	4.5 - 8.17

Reasonable Potential Determination

In accordance with s. NR 217.15(1), Wis. Adm. Code, there is reasonable potential for the discharge to cause or contribute to an exceedance of the water quality criteria. Therefore, **continuation of the WQBEL is required.**

Limit Expression

According to s. NR 217.14(2), Wis. Adm. Code, because the calculated WQBEL is less than or equal to 0.3 mg/L, the effluent limit of 0.075 mg/L may be expressed as a six-month average. If a concentration limitation expressed as a six-month average is included in the permit, a monthly average concentration limitation of 0.225 mg/L equal to three times the WQBEL calculated under s. NR 217.13, Wis. Adm. Code shall also be included in the permit. The six-month average should be averaged during the months of May – October and November – April.

Also, per s. NR 217.14 (1)(a)(2), Wis. Adm. Code, a mass limit is required since the discharge is upstream of the Wisconsin River, which is designated as an exceptional resource water in ch. NR 102.11(1)(d)4., Wis. Adm. Code. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.064 MGD = 0.04 lbs/day expressed as a monthly average.**

PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in chs. NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. Daily maximum and weekly average temperature criteria are available for the 12 different months of the year depending on the receiving water classification.

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from February 2019 to July 2024.

Since there is no data available during the current permit term and thermal conditions have not drastically changed in the Avoca Wastewater Treatment Facility, maximum temperatures reported during monitoring from April 2011 to April 2012.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		**Calculated Effluent Limit**	
	Weekly Maximum (°F)	Daily Maximum (°F)	**Weekly Average Effluent Limitation** (°F)	**Daily Maximum Effluent Limitation** (°F)
JAN	41	42	-	120
FEB	42	42	-	120
MAR	55	57	-	120
APR	54	54	107	120
MAY	59	61	116	120
JUN	66	69	-	120
JUL	73	74	-	120
AUG	73	74	-	120
SEP	69	72	-	120
OCT	64	64	-	120
NOV	54	56	120	120
DEC	48	49	-	120

Reasonable Potential
Permit limits for temperature are recommended based on the procedures in s. NR 106.56, Wis. Adm. Code.

- An acute limit for temperature is recommended for each month in which the representative daily maximum effluent temperature for that month exceeds the acute WQBEL. The representative daily maximum effluent temperature is the greater of the following:
  (a) The highest recorded representative daily maximum effluent temperature
  (b) The projected 99th percentile of all representative daily maximum effluent temperatures
- A sub−lethal limitation for temperature is recommended for each month in which the representative weekly average effluent temperature for that month exceeds the weekly average WQBEL. The representative weekly average effluent temperature is the greater of the following:
  (a) The highest weekly average effluent temperature for the month.
  (b) The projected 99th percentile of all representative weekly average effluent temperatures for the month

Based on the available effluent data **no effluent limits or monitoring are recommended** for temperature.

PART 6 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document* (2022).

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC_{50} (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.

- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC_{25} (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 22% shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

$$IWC\ (as\ \%) = Q_e \div \{(1 - f)\ Q_e + Q_s\} \times 100$$

Where:

Q_e = annual average flow = 0.064 MGD = 0.099 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = ¼ of the 7-Q_{10} = 1.4 cfs ÷ 4 = 0.35 cfs

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 002 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge The specific receiving water location must be specified in the WPDES permit.

- Shown below is a tabulation of all available WET data for Outfall 002. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations.

WET Data History

Date Initiated	Acute Results LC_{50} % (% survival in 100% effluent)				Chronic Results IC_{25} %				Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Use in RP?	*C. dubia*	Fathead Minnow	Pass or Fail?	Use in RP?	
07/25/2007	>100	>100	Pass	Yes					

- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.

  Acute Reasonable Potential = [(TUa effluent) (B)(AMZ)]
  Chronic Reasonable Potential = [(TUc effluent) (B)(IWC)]

  According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUc effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC_{50}, IC_{25} or $IC_{50} \geq 100\%$).

  Acute Reasonable Potential = 0 < 1.0, **reasonable potential is not shown, and a limit is not required.**

Attachment #1

The WET checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other related permit conditions. The checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code. The checklist steps the user through a series of questions, assesses points based on the potential for effluent toxicity, and suggests monitoring frequencies based on points accumulated during the checklist analysis. As toxicity potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is not occurring. A summary of the WET checklist analysis completed for this permittee is shown in the table below. Staff recommendations based on best professional judgment are provided below the summary table. For guidance related to reasonable potential and the WET checklist, see Chapter 1.3 of the WET Guidance Document: https://dnr.wisconsin.gov/topic/Wastewater/WET.html.

WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable. **0 Points**	IWC = 22 %. **0 Points**
Historical Data	No data available in past 5 years. **5 Points**	No data available in past 5 years. **5 Points**
Effluent Variability	Little variability, some violations or upsets, consistent WWTF operations. **0 Points**	Same as Acute. **0 Points**
Receiving Water Classification	WWSF **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	No reasonable potential for limits based on ATC. Ammonia Nitrogen, Arsenic, Chromium, Chloride, Copper, Lead, Nickel and Zinc detected. **3 Points**	No reasonable potential for limits based on CTC. Ammonia nitrogen limits carried over from the current permit. Arsenic, Chromium, Chloride, Copper, Lead, Nickel and Zinc detected. **3 Points**
Additives	0 Biocides and 1 Water Quality Conditioner added. Permittee does not have proper P chemical SOPs in place. **16 Points**	All additives used more than once per 4 days. **16 Points**
Discharge Category	0 Industrial Contributors. **0 Points**	Same as Acute. **0 Points**
Wastewater Treatment	Secondary or Better **0 Points**	Same as Acute. **0 Points**
Downstream Impacts	No impacts known **0 Points**	Same as Acute. **0 Points**

	Acute	Chronic
Total Checklist Points:	**29 Points**	**29 Points**
Recommended Monitoring Frequency (from Checklist):	3 tests during permit term	3 tests during permit term
Limit Required?	No	No
TRE Recommended? (from Checklist)	No	No

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described **3x acute and 3x chronic WET tests are recommended** in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued). **If a satisfactory phosphorus chemical SOP is established and implemented at the facility prior to permit reissuance, then WET testing will not be required in the reissued permit.**

Ammonia Nitrogen Calculations from WQBEL dated June 6, 2012:

AMMONIA (as N) LIMITS		**Avoca**		
CLASSIFICATION:		**WARMWATER SPORTFISH,**		
EFFLUENT FLOW (mgd):		0.064		
EFFLUENT FLOW (cfs):		0.099		
MAX. EFFLUENT pH (s.u.):		7.3		
BACKGROUND INFORMATION:		***summer***	***winter***	***April***
7Q10 (cfs)		1.4	1.4	1.4
7Q2 (cfs)		2.1	2.1	2.1
Ammonia (mg/L)		0.06	0.12	0.06
Temperature (deg C)		23	3	9
pH (std. units)		8.21	7.97	7.97
% of river flow used:		100	25	25
Reference weekly flow:		1.4	0.35	0.35
Reference monthly flow:		1.785	0.44625	0.44625
CRITERIA (in mg/L):				
Acute (@ effl. pH):		26.21	26.21	26.21
4-day Chronic (@ backgrd. pH):				
early life stages present		2.55	6.35	6.35
early life stages absent		2.55	10.31	9.06
30-day Chronic (@ backgrd. pH)				
early life stages present		1.02	2.54	2.54
early life stages absent		1.02	4.12	3.63
EFFLUENT LIMITS (in mg/L):				
Daily maximum (also see below)		52.43	52.43	52.43
Weekly average				
early life stages present		37.81	28.37	28.58
early life stages absent			46.33	
Monthly average				
early life stages present		18.35	13.45	13.72
early life stages absent			22.17	

Calculations from Expression of Limits Memo dated February 5, 2018

PART 7 – EXPRESSION OF LIMITS

Revisions to ch. NR 106 and 205, Wis. Adm. Code align Wisconsin's water quality-based effluent limitations with 40 CFR 122.45(d), which requires WPDES permits contain the following concentration limits, whenever practicable and necessary to protect water quality:

- Weekly average and monthly average limitations for continuous discharges subject to ch. NR 210.
- Daily maximum and monthly average limitations for all other discharges.

Avoca is a POTW, and is therefore subject to weekly average and monthly average limitations whenever limitations are determined to be necessary.

This evaluation provides additional limitations necessary to comply with the expression of limits in s. NR 106.07, Wis. Adm. Code and or s. NR 205.065(7), Wis. Adm. Code. Pollutants already compliant with s. NR 106.07 or that have an approved impracticability demonstration, are excluded from this evaluation including water-quality based effluent limitations for phosphorus, temperature, and pH, among other parameters.

Additional limitations needed to comply with s. NR 106.07 Expression of limits (in bold):

Parameter	Weekly Average	Monthly Average	Weekly Geometric Mean	Monthly Geometric Mean	Multiplication Factor (CV)	Assumed Monitoring Frequency (n)
Fecal Coliform			**656#/100mL**	400#/100mL	1.64	4/month
NH3-N May - September	**35 mg/L**	18 mg/L			1.95	8/month
NH3-N October - March	**42 mg/L**	22 mg/L			1.95	8/month

Ammonia Nitrogen: The existing permit has monthly average limits for ammonia nitrogen year round, however there is only a weekly average limit for the month of April. In order to comply with Wis. Adm. Code and 40 CFR, the reissued permit will need to have a weekly average limit for ammonia nitrogen during the other times of the year. Based on the nature of the dataset for ammonia nitrogen, a default CV of 0.6 is recommended. The twice per week monitoring frequency for ammonia nitrogen is not anticipated to change in the reissued permit, so 8 samples are expected each month. Accordingly, a multiplication factor of 1.95 times the existing limit is used to calculate the weekly average limit. The results are shown in the table below.

Ammonia Nitrogen, mg/L

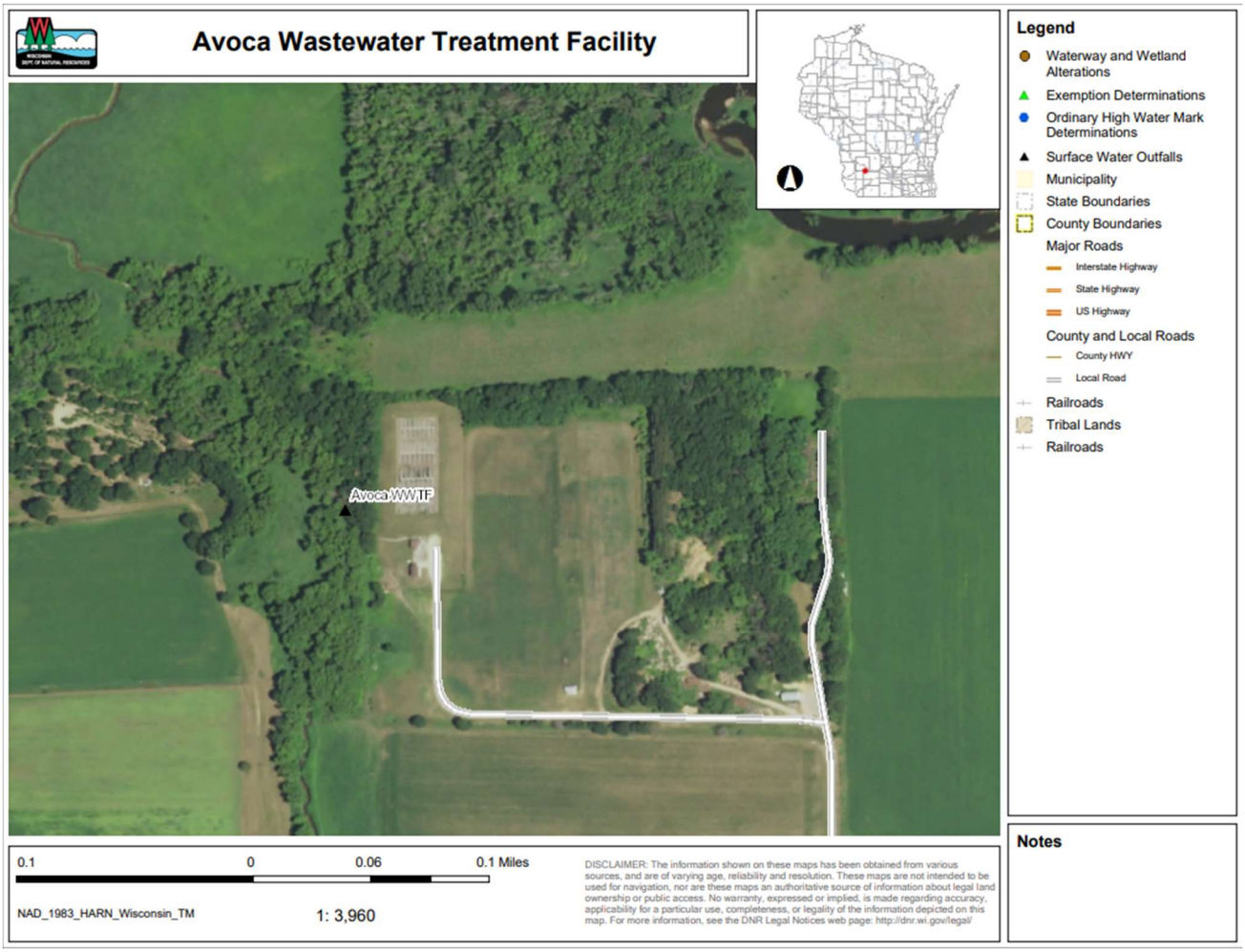
Months Applicable	Daily Maximum	Weekly Average	Monthly Average
May - September	No limit	**35***	18
October - March	No limit	**42***	22
April	No limit	29	14

*value calculated using multiplier of 1.95 times the existing monthly average limit.

The weekly average limits for May-September and October-March are less than the calculated WQBELs for these time periods shown in Part 3, therefore they are ultimately recommended for permit reissuance.

There are not believed to be any other parameters for which additional limit expressions are needed.

Site Map:


Avoca Wastewater Treatment Facility
Avoca WWTF
Legend
Waterway and Wetland Alterations
Exemption Determinations
Ordinary High Water Mark Determinations
Surface Water Outfalls
Municipality
State Boundaries
County Boundaries
Major Roads
Interstate Highway
State Highway
US Highway
County and Local Roads
County HWY
Local Road
Railroads
Tribal Lands
Railroads
Notes
0.1
0
0.06
0.1 Miles
NAD_1983_HARN_Wisconsin_TM
1: 3,960
DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: http://dnr.wi.gov/legal/

Temperature Table:

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	Avoca WWTF		**7-Q_{10}:**	1.40 cfs		**Temp Dates** / **Flow Dates**
Outfall(s):	002		**Dilution:**	25%	**Start:**	04/01/11 / 01/01/19
Date Prepared:			**f:**	0	**End:**	04/01/12 / 06/23/24
Design Flow (Qe):	0.06 MGD		**Stream type:**	Small warm water sport or forage fish co		
Storm Sewer Dist.	0 ft		**Qs:Qe ratio:**	3.5 :1		
			Calculation Needed?	YES		

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(cfs)	(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	1.40	0.034	0.042	0	41	42	NA	120
FEB	34	50	76	1.40	0.032	0.039	0	42	42	NA	120
MAR	38	52	77	1.40	0.040	0.058	0	55	57	NA	120
APR	48	55	79	1.40	0.030	0.038	0	54	54	107	120
MAY	58	65	82	1.40	0.031	0.037	0	59	61	116	120
JUN	66	76	84	1.40	0.031	0.040	0	66	69	NA	120
JUL	69	81	85	1.40	0.033	0.040	0	73	74	NA	120
AUG	67	81	84	1.40	0.030	0.037	0	73	74	NA	120
SEP	60	73	82	1.40	0.032	0.040	0	69	72	NA	120
OCT	50	61	80	1.40	0.037	0.041	0	64	64	NA	120
NOV	40	49	77	1.40	0.029	0.037	0	54	56	120	120
DEC	35	49	76	1.40	0.030	0.035	0	48	49	NA	120

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
3911 Fish Hatchery Rd.
Fitchburg, WI 53711

Tony Evers, Governor

Telephone 608-266-2621
FAX 608-267-3579
TTY Access via relay - 711

WISCONSIN
DEPT. OF NATURAL RESOURCES

October 31, 2024

Liz Wilkinson
Village Clerk
401 Wisconsin St
Avoca, WI 53506

Subject: Avoca Wastewater Treatment Facility - WPDES Permit WI-0060151
Water Quality Trading Plan – CONDITIONAL APPROVAL

Dear Liz Wilkinson:

The Department recently received a water quality trading plan (WQT Plan) for compliance with phosphorus effluent limits at the Avoca Wastewater Treatment Facility. The initial plan was received in January of 2024 and updated versions were received in August and October of 2024. Based on WDNR review, the final WQT Plan (dated August 2024) is in general conformance with the WDNR Water Quality Trading Guidance and Section 283.84 of the Wisconsin Statutes. The WQT plan proposes installation of streambank stabilization which will utilize grading and vegetation establishment to prevent erosion of sediment from the streambanks of Morrey Creek. The timeline for practice installation, as set forth in the WQT plan, indicates practices will be installed by October 31st, 2025. Credits generated from approved practices result in available credit quantities shown in Table 1. These credits will be incorporated into the reissued WPDES permit and will be used to demonstrate compliance with final phosphorus effluent limits beginning November 1st, 2025.

Table 1: Total Phosphorus Credits Available per WQT-2024-0024

Year	Available Credits (lbs/yr) – Total
2025	32
2026	192
2027	192
2028	192
2029	192
2030	192

The Department conditionally approves the WQT Plan as a basis for water quality trading during the next WPDES permit term. The Department has assigned the WQT plan a tracking number of WQT-2024-0024 and will be referenced as such in the draft WPDES permit. The final WQT plan will be included as part of the public

notice package for permit reissuance. The draft WPDES permit will include a requirement for an annual trading report and effluent monitoring for total phosphorus.

If you have any questions or comments, please contact me at 608-419-4155 or at betsyjo.howe@wisconsin.gov.

Thank You,

BetsyJo Howe

BetsyJo Howe
Water Quality Trading Coordinator
Wisconsin Department of Natural Resources

e-CC:

Ronee Harris, Village of Avoca
Jason Deglow, Village of Avoca
Jordan Fure, P.E. Delta 3 Engineering, Inc.
Lisa Creegan, WDNR
Kenzie Ostien, WDNR
Matt Claucherty, WDNR

WATER QUALITY TRADING PLAN

August 9, 2024

Village of Avoca
Wastewater Treatment Facility

WPDES Permit No. WI-0060151-09-1
Lagoon Road
Avoca, Wisconsin 53506

Prepared by:

Delta 3 Engineering, Inc.

875 S Chestnut St. │ Platteville, WI 53818
Phone: (608) 348-5355
mail@delta3eng.biz

www.delta3eng.biz

DELTA 3
EVERY ANGLE COVERED

Project Number: D22-209

TABLE OF CONTENTS

Attachments

I. Executive Summary -

This Water Quality Trading Plan summarizes the Village of Avoca's (Village) plan to utilize Water Quality Trading (WQT) for compliance with the final total phosphorus limit as provided in the Wisconsin Pollutant Discharge Elimination System (WPDES) Permit #WI 0060151-09-1. The Wastewater Treatment Facility (WWTF) treated 0.0261 MGD with an average effluent Total Phosphorus (TP) concentration of 5.65 mg/L in 2022. The WWTF plans to install chemical Phosphorus treatment with a filter and offset remaining TP with WQT Credits to consistently meet the final annual six-month average limit of 0.075 mg/L and a monthly average limit of 0.225 mg/L.

NRCS Streambank Erosion modeling methods were used to calculate the total phosphorus credits that would be generated based on the installation of best management practices (BMPs). As demonstrated in modeling results from Table 1.1, the WWTF has the ability to register approximately 192 credits. The WWTF intends to monitor TP credit usage and intends to perform construction of additional BMPs as needed for future effluent TP to comply with WPDES Permits Limits. A new Water Quality Trading Plan will be submitted at that time for new BMP practices and credit production.

Table 1.1 – Modeling Results

Reach	Lateral Recession Rate (ft/yr.)	Current Phosphorus Loading (lbs./yr.)	Proposed Phosphorus Loading (lbs./yr.)	Proposed Phosphorus Reductions (lbs./yr.)	Trade Ratio	Proposed Phosphorus Credits
1L	0.30	25	0	25	3:1	8
2L	0.40	8	0	8	3:1	3
3L	0.30	12	0	12	3:1	4
4L	0.50	24	0	24	3.1:1	8
1R	0.40	24	0	24	3:1	8
2R	0.40	68	0	68	3:1	23
3R	0.50	18	0	18	3:1	6
4R	0.50	56	0	56	3:1	19
5R	0.50	28	0	28	3:1	9
6R	0.30	11	0	11	3:1	4
7R	0.50	42	0	42	3:1	14
8R	0.40	21	0	21	3:1	7
9R	0.50	10	0	10	3:1	3
10R	0.20	5	0	5	3:1	2
11R	0.50	12	0	12	3:1	4
12R	0.40	25	0	25	3:1	8
13R	0.50	46	0	46	3:1	15
14R	0.50	34	0	34	3.1:1	11
15R	0.40	111	0	111	3.1:1	36
					Total	**192**

NOTE:

Trade Ratio = (Delivery + Downstream + Equivalency + Uncertainty – Habitat Adjustment):1

Delivery = 0 (Trading within same HUC-12 Watershed)

Downstream = 0 (For trades upstream of Outfall 001)

Downstream = 0.1 (For trades downstream of Outfall 001)

Equivalency = 0 (Not necessary of Total Phosphorus)

Uncertainty: *Streambank Stabilization without Habitat Restoration* = 3

II. Background -

The purpose of this Water Quality Trading Plan (Plan) is to describe the Village's use of Water Quality Trading to offset effluent phosphorus for compliance with the Village's WPDES Permit #WI-0060151-09-1. Along with the Water Quality Trading Plan, the Notice of Intent to Conduct Water Quality Trading is provided in Attachment #1, while the Water Quality Trading Checklist Form 3400-208 is provided in Attachment #2.

The Village of Avoca (Village) is located along State Trunk Highway '133' in the northwestern portion of Iowa County in Southwest Wisconsin along the confluence of Morrey Creek and the Wisconsin River. The Village owns and operates a Wastewater Treatment Facility (WWTF) which serves a population of approximately 553 residents and is comprised of primarily residential development.

The existing sanitary sewer collection system consists of approximately 27,700 feet of eight-inch (8") gravity sanitary sewer with 101 manholes. Three (3) lift stations are utilized throughout the collection system, with approximately 5,650 feet of six-inch (6") and 2,100 feet of four-inch (4") force main to assist with the transport of wastewater to the Wastewater Treatment Facility (WWTF). The location of the WWTF is provided in Attachment #3. Please refer to Attachment #4 – Sanitary Sewer Map for location of sanitary sewer collection system components.

The Village of Avoca owns and operates a WWTF which consists of a six-inch (6") force main delivering raw wastewater to the headworks which consists of a vertical mechanical screen and bypass bar screen. From the headworks, wastewater proceeds to the septic tank structure containing three (3) tanks in series and a dosing chamber for secondary treatment. Following the dosing chamber, wastewater is pumped to the recirculating sand filters. A splitter structure is then utilized to send effluent from the recirculating sand filters to the dosing tank for further treatment or to ultraviolet disinfection prior to discharge at Outfall 001 Morrey Creek, a tributary of the Wisconsin River (Otter-Morrey Creek Watershed, LW11 – Lower Wisconsin River Basin). Primary waste from the wastewater treatment process is stored in the septic tanks, and the contents removed and disposed of by a licensed and certified septage hauler in accordance with NR 113 of the Wisconsin Administrative Code. The current WWTF treats 0.0261 MGD on an annual average with a design flow of 0.064 MGD. Please see Attachment #5 for the WWTF flow schematic.

The monthly average influent and effluent flows and loadings at the WWTF for 2021 and 2022 are provided in Table 2.1 and Table 2.2.

Table 2.1 – 2021 Monthly Averages

Month	Flow	BOD_5		Suspended Solids		Total Phosphorus		Total Phosphorus
	(MGD)	(mg/L)		(mg/L)		(mg/L)		(lbs./day)
	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Effluent
Jan. (’21)	0.0253	466	5	253	3	-	6.61	1.39
Feb. (’21)	0.0309	357	6	274	4	-	6.70	1.73
Mar. (’21)	0.0309	436	4	228	2	-	6.95	1.79
Apr. (’21)	0.0348	525	5	259	3	-	6.71	1.95
May (’21)	0.0290	504	3	259	2	-	7.51	1.82
June (’21)	0.0250	431	3	257	2	-	6.63	1.39
July (’21)	0.0256	370	1	278	2	-	5.94	1.27
Aug. (’21)	0.0299	458	0	311	1	-	5.75	1.43
Sept. (’21)	0.0277	312	1	235	1	-	5.88	1.36
Oct. (’21)	0.0204	373	0	284	1	-	4.80	0.82
Nov. (’21)	0.0237	373	2	307	4	-	4.78	0.94
Dec. (’21)	0.0245	328	3	222	4	-	5.82	1.19
Annual Average =	**0.0273**	**411**	**3**	**264**	**2**	**-**	**6.17**	**1.42**

Table 2.2 – 2022 Monthly Averages

	Flow	BOD_5		Suspended Solids		Total Phosphorus		Total Phosphorus
	(MGD)	(mg/L)		(mg/L)		(mg/L)		(lbs./day)
	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Effluent
Jan. (’22)	0.0230	379	5	271	3	-	4.51	0.86
Feb. (’22)	0.0236	373	6	279	3	-	4.56	0.90
Mar. (’22)	0.0275	406	8	231	5	-	5.23	1.20
Apr. (’22)	0.0254	456	8	312	4	-	6.22	1.32
May (’22)	0.0232	461	8	241	8	-	6.47	1.25
June (’22)	0.0222	379	5	239	2	-	9.58	1.77
July (’22)	0.0259	328	2	209	1	-	5.63	1.22
Aug. (’22)	0.0284	355	2	199	1	-	5.30	1.26
Sept. (’22)	0.0300	261	1	275	1	-	5.08	1.27
Oct. (’22)	0.0251	369	2	267	1	-	5.08	1.06
Nov. (’22)	0.0278	373	1	253	1	-	5.04	1.17
Dec. (’22)	0.0313	348	3	267	3	-	5.05	1.32
Annual Average =	**0.0261**	**374**	**4**	**253**	**3**	**-**	**5.65**	**1.22**

The facility has been able to consistently meet its Wisconsin Pollutant Discharge Elimination System (WPDES) permit limits for BOD_5 and TSS. The facility is currently operating under an Individual Phosphorus Variance (IPV) with an interim effluent Total Phosphorus (TP) limit of

7.3 mg/L. The WWTF will ultimately be required to achieve a final effluent TP limit of 0.075 mg/L.

In 2022, the Village has been able to maintain an average Total Phosphorus effluent of 5.65 mg/L which is well within the WPDES interim limit of 7.3 mg/L. The Village has made efforts to optimize TP reduction at the WWTF. To reduce effluent TP, the Village is currently planning for a chemical addition and tertiary filtration upgrade to help meet low level effluent phosphorus limits.

Additionally, the Village has investigated watershed compliance alternatives such as Water Quality Trading (WQT) and Adaptive Management (AM). Background TP concentration on the Morrey Creek is monitored from Station #253192. As calculated in the Water Quality Based Effluent Limit (WQBEL) on February 5, 2018, the rolling median TP concentration was 0.093 mg/L. The median average was almost 1.25x the applicable Water Quality Standard (WQS) of 0.075 mg/L. Following discussion with the DNR and initial investigation, the Village elected to move forward with WQT. Utilizing the results from PRESTO, the watershed of the WWTF has a nonpoint source ratio of 5:95 at the point of discharge and is considered to be nonpoint-source dominated. Therefore, the Village intends to perform WQT projects upstream of the outfall but within the Village's Hydrological Unit Code – 12 (HUC-12) watershed #070700051206 as provided in Attachment #6.

Flow and loading data from 2022 was utilized to determine credits needed. Calculations for required WQT reductions are provided below:

1) The current annual Phosphorus loading discharged at the WWTF is calculated as follows:

Seasonal Average Daily Flow (Q) = 0.0261 MGD
Average Phosphorus Concentration = 5.65 mg/L

5.65 mg/L x 0.0261 MGD x 8.34 x 365 days/yr. = **449 lbs./yr**.

2) The proposed allowable annual Phosphorus mass limit at the WWTF is calculated as follows:

Seasonal Average Daily Flow (Q) = 0.0261 MGD
Proposed Seasonal Phosphorus Concentration Limit = 0.075 mg/L

0.075 mg/L x 0.0261 MGD x 8.34 x 365 days/yr. = **6 lbs./yr**.

3) Reduction of Total Phosphorus required at WWTF -

449 lbs./yr. – 6 lbs./yr. = 443 lbs./yr.

However, the Village intends to add chemical and a tertiary filter to treat effluent TP to 1.0 mg/L. The expected required offset is as follows:

(0.5 - 0.075) mg/L x 0.0261 MGD x 8.34 x 365 days/yr = **74 lbs/yr**

To generate the required 74 TP credits, the Village intends to perform streambank stabilization. The Village intends to generate additional credits as a safety factor and for future growth.

III. Location and Description of Credit Generation Sites –

The Village discharges to Morrey Creek (Otter-Morrey Creek Watershed, LW11 – Lower Wisconsin River Basin) at Outfall 001. As mentioned previously, the Village intends to perform WQT projects within the Village's HUC-12 #070700051206. The Village plans to perform streambank stabilization which will utilize grading to prevent the erosion of sediment from the streambanks. Projects will occur on private property. Streambank stabilization will not only prevent sediment from entering the stream, but will also prevent phosphorus, nitrogen, and other pollutants from discharging to the Morrey Creek. See Figure 3.1 for additional project location information.

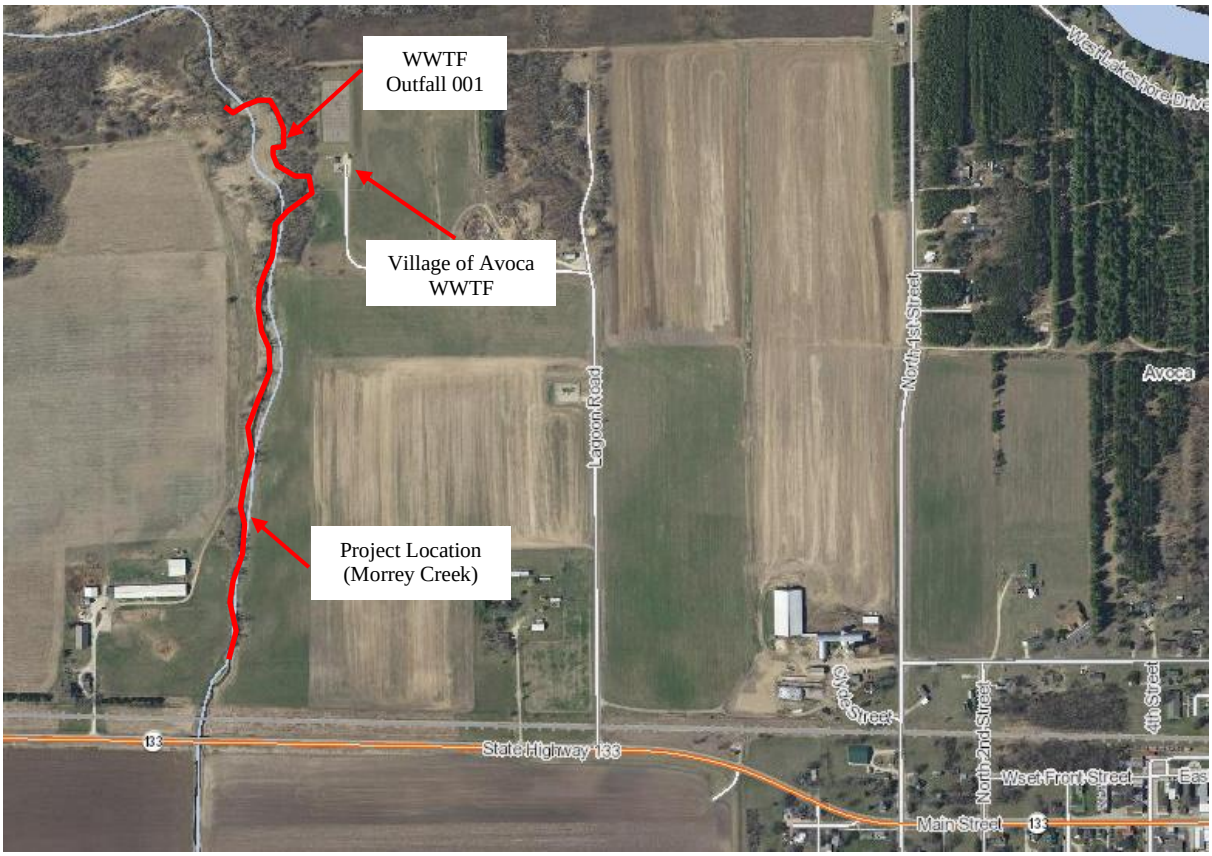


Figure 3.1 – Project location in relation to Outfall 001

IV. Methods for Nonpoint Source Load Reduction –

The Village would like to acquire additional WQT trading credits for a safety factor in the event that effluent credits are lost or the WWTF discharges additional mass of TP. The Plan identifies trading practices that will reduce TP runoff and will utilize calculated trade ratios for upstream and downstream trades. The trade credits will be available indefinitely as long as trading practices are maintained.

A. Methods Used to Generate Load Reductions

For streambank stabilization, the Village has the ability to generate TP load reductions through streambank grading of approximately 3,243 lineal feet of streambank.

Streambank Stabilization will be performed as per NR 328 *Shore Erosion Control Structures in Navigable Waterways and* NRCS 580 *Streambank and Shoreline Protection*. Grading will occur above the Ordinary High-Water Mark (OHWM). The Village will coordinate OHWM demarcation with the Contractor prior to and during construction. Streambank shaping will eliminate the discharge of sediment to the stream. Soil from grading will be stockpiled on site and/or used as fill on the private property. No fill shall be deposited within wetlands or floodplain. Once grading is completed, the stream banks will be stabilized seeding and mulch in order to re-establish vegetation as per the Landscaping Specification in Attachment #13 The streambank stabilization project will occur within HUC-12 #070700051206 in order to generate TP credits. Standard Plans and Specifications for the Project Site will be provided by a Professional Engineer. The Village will also acquire all required permits and authorizations for the Projects.

To register credits, the Village has entered into trade agreements with Property Owners pursuant to *s. 283.84(1)(b), Wis. Stats*.

B. History of Project Site

The Project Site is planned on private property within the Otter-Morrey Creek Watershed along the Morrey Creek. Adjacent land use consists of agricultural cropland. The vegetative cover is primarily row crops, hay, and brush. Heartland Ecological Group identified no wetlands. Therefore no wetlands will be impacted by the WQT Project. A wetland map is provided in Attachment #7 – Wetland Map which includes DNR Surface Water Data Viewer wetland layers.

The streambanks have experienced significant erosion as the watershed has been cleared for agricultural use. Development and agricultural practices caused long term deposition of silt within the floodplain followed by decades of stream morphology eroding a new channel through the deposition. Streambanks are eroding due to high-water elevation, high-water velocity, and the steepness of the banks which causes the soils to erode. By grading the banks to a gradual slope, the bank soils will be less

susceptible to erosion. Additionally, the high-water elevation and high-water stream velocity will be decreased due to greater cross-sectional area.

The banks are bare with slumps, rills and sever vegetative overhang throughout. Severe erosion indicators such as undercuts, slumps, tree roots, and fallen trees are readily visible throughout the site. The erosion indicators demonstrate the lateral recession rate is **Severe (0.3-0.5 ft/yr)** based on the NRCS Recession Rate Table.

C. Trade Ratio

The Plan identifies trading practices that will reduce TP runoff. However, the DNR requires a trade ratio to provide a safety factor for meeting water quality standards. Trade ratios consider pollutant reductions of varying certainty, location, and type. For the given WQT practice, an uncertainty factor of 3:1 was utilized.

Downstream trade factors were determined by Table 4.1 as provided by the Wisconsin DNR.

Table 4.1 – Downstream Trading Factor

Percent Difference Between Credit User's Load and Total Load at the Point of the Credit User's Point of Standards Application	Downstream Trading Factor
<25%	0.1
<50%	0.2
<75%	0.4
≥75%	0.8

Percent Difference = (1- (Qe x Ce) / (Qe x Ce + Qs x Cs)) x 100 = 22%
22% < 25%
Downstream Trading Factor = 0.1

Qs = Receiving water flow (7Q2) = 2.1 cfs
Qe = Design Flow = 0.064 MGD = 0.10 cfs
Cs = Background concentration of TP = 0.075 mg/L
Ce = Effluent concentration of TP = 5.65 mg/L

The trade ratio is derived as follows:

Trade Ratio = (Delivery + Downstream + Equivalency + Uncertainty – Habitat Adjustment):1
Delivery = 0 (Trading within same HUC-12 Watershed)
Downstream = 0 (For trades upstream of Outfall 001)
Downstream = 0.1 (For trades downstream of Outfall 001)
Equivalency = 0 (Not necessary of Total Phosphorus)
Uncertainty: *Streambank Stabilization without Habitat Restoration* = 3

Uncertainty factor was determined from Appendix H – Management Practices and Associated Information of the Wisconsin Department of Natural Resources *Guidance for implementing Water Quality Trading in WPDES Permits (Edition 2)*.

- **Upstream trade ratios were therefore calculated as 3:1.**

- **Downstream trade ratios were calculated as 3.1:1.**

D. Model Used to Derive Load Reductions

NRCS Streambank Erosion modeling methods were used to calculate the total phosphorus credits that would be generated based on the installation of BMPs. These credits will be used to demonstrate compliance with the final total phosphorus limit as proposed in the WPDES Permit. Modeling results are provided in Table 4.2. If the Plan or model inputs change during construction, the Village will submit to the DNR the revised models and calculations to more accurately reflect and number of credits generated.

Table 4.2 – Modeling Results

Reach	Lateral Recession Rate (ft/yr.)	Current Phosphorus Loading (lbs./yr.)	Proposed Phosphorus Loading (lbs./yr.)	Proposed Phosphorus Reductions (lbs./yr.)	Trade Ratio	Proposed Phosphorus Credits
1L	0.30	25	0	25	3:1	8
2L	0.40	8	0	8	3:1	3
3L	0.30	12	0	12	3:1	4
4L	0.50	24	0	24	3.1:1	8
1R	0.40	24	0	24	3:1	8
2R	0.40	68	0	68	3:1	23
3R	0.50	18	0	18	3:1	6
4R	0.50	56	0	56	3:1	19
5R	0.50	28	0	28	3:1	9
6R	0.30	11	0	11	3:1	4
7R	0.50	42	0	42	3:1	14
8R	0.40	21	0	21	3:1	7
9R	0.50	10	0	10	3:1	3
10R	0.20	5	0	5	3:1	2
11R	0.50	12	0	12	3:1	4
12R	0.40	25	0	25	3:1	8
13R	0.50	46	0	46	3:1	15
14R	0.50	34	0	34	3.1:1	11
15R	0.40	111	0	111	3.1:1	36
					Total	**192**

NOTE:

Trade Ratio = (Delivery + Downstream + Equivalency + Uncertainty – Habitat Adjustment):1

Delivery = 0 (Trading within same HUC-12 Watershed)
Downstream = 0 (For trades upstream of Outfall 001)
Downstream = 0.1 (For trades downstream of Outfall 001)
Equivalency = 0 (Not necessary of Total Phosphorus)
Uncertainty: *Streambank Stabilization without Habitat Restoration* = 3

Soil testing has been completed to determine TP concentrations within the soil. Soil sampling was performed approximately every 200 feet and included the use of a soil sampler which pulled ¾" cores at 8" depth. Approximately six (6) cores were taken at each sampling location to provide a representative sample. Soils maps and soil testing data is provided in Attachment #8.

Streambank cross sections were surveyed every 100 feet with global position system (GPS) equipment. The site was also surveyed with an aerial drone. Streambank heights were then calculated as per guidance for the NRCS Streambank Erosion Estimator. An average height was determined for each reach for input to the NRCS Streambank Erosion Estimator. Bank height data and calculations are provided in Attachment #10.

An onsite evaluation has been conducted to estimate stream bank recession rate. The data, narrative, and photos documenting the current state of eroding stream banks are provided in Attachment #9.

With the collected data, the NRCS Streambank Erosion Estimator was used to calculate TP loss from each reach of the eroding streambank. The modeling data for the NRCS Streambank Erosion Estimator is available in Attachment #10. The streambank grading design will eliminate streambank recession thus eliminating TP inputs within the Project areas.

E. Operation and Maintenance

An Operation and Maintenance (O&M) Plan is provided in Attachment #11. The O&M plan describes how the Stream Stabilization Practices will be operated and maintained. The O&M Plan also addresses response procedures for Practice Registration, Noncompliance Notification, and Notification of Trade Agreement Termination.

As previously mentioned, the Village is planning to perform streambank stabilization by implementing BMPs along the Morrey Creek streambanks. The stabilization practices will be installed and maintained per the Plans and Specifications as provided in Attachment #12. BMPs are to follow NR 328 Shore Erosion Control Structures in Navigable Waterways and NRCS 580 Streambank and Shoreline Protection. Restoration landscaping and seeding will be installed following construction and will be closely monitored for a minimum of two (2) growing seasons to ensure the new seeding grows and erosion is not prevalent. Weeds and invasive vegetation growth will be addressed if present.

The BMPs will be inspected annually by a licensed Professional Engineer to ensure that the BMPs are functioning as intended in order to meet the requirements of this WQT Plan.

V. Trade Timeline –

Schedule for Installation of the above mentioned trading practices for Total Phosphorus Credit Generation for TP compliance is provided in Table 5.1 below.

Table 5.1 – Trade Timeline

Item	Completion Timeline
Site Investigation	Spring 2023
Conceptual Design	Fall 2023
Final Design	Winter 2023
Construction Permits	Winter 2023/Spring 2024
DNR Review of Final Design	Fall 2024
Construction of BMPs	Spring/Fall 2025
Phosphorus Credit Registration	October 31, 2025
Use of Phosphorus Credits (Ongoing for Permit Compliance)	November 1, 2025

Credits will be used by the Village beginning November 1, 2025. Credits will continue as long as the trading practices are maintained as outlined in this WQT Plan.

VI. Inspection Reporting –

A. Tracking Procedures

The Village will track credits used monthly. The Village will report credit usage to the DNR on a monthly basis in the Discharge Monitoring Reports (DMRs). The annual report will summarize the 12 months of credit usage and credit generation. The Village will report to DNR any concern that they have that may result in a need to modify the trade agreement and/or this trade plan. For example, a need to generate additional credits based on discharge.

B. Inspection

Inspection of the BMPs shall occur during construction phase to ensure they are installed per the design and meet all applicable codes and permits. Once completed, inspections of the established BMPs shall occur each month at a minimum or following heavy rain events. A licensed professional engineer will perform an annual certification to ensure the practice is performing as designed and the Village remains in compliance.

The inspection reports will include:

i. Name and contact information of the inspector
ii. Inspection Date
iii. Relevant standards set forth in the Design Plan or Operation and Maintenance Plan
iv. Issues identified
v. When and how any issues identified were addressed
vi. When and how any issues identified will be addressed in the future

Photographs of the trading practices will be taken at least once per year and will be provided with the Annual Water Quality Trading Report.

Inspection reports generated during each routine or after rain event inspection will be included with the Annual Water Quality Trading Report submitted by the Village to DNR. Annual inspections by a professional engineer will typically occur in April or May. This time of year is ideal for evaluating the condition of BMPs as it follows the freeze/thaw which poses the greatest potential for changes to the BMPs. Minimal vegetation cover will allow for adequate visual inspection.

C. Management Practice Registration Form

The Village will file a completed registration form 3400-207 for Water Quality Trading Management Practice Registration separately from this Plan.

D. Annual Water Quality Trading Report Submittal

The following shall be submitted to the DNR by January 31 of each year:

i. The number of pollutant reduction credits (lbs./month) used each month of the previous year to demonstrate compliance;
ii. A summary of the annual inspection of the practice that generated any of

the pollutant reduction credits used during the previous year, this inspection shall be completed by a licensed Professional Engineer;

iii. All monthly inspection reports and photos;
iv. Identification of noncompliance or failure to implement any terms or conditions of this permit with respect to water quality trading that have not been reported in discharge monitoring reports;
v. A list of all noncompliance and the correction measures and timing to address the issues throughout the year; and
vi. An updated WQT plan if management practices have or will change.

E. Monthly Certification of Management Practices

Each month, the Village will certify that the BMPs are maintained and operating in a manner consistent with this Water Quality Trading Plan or provide a statement noting noncompliance with this Plan. The monthly Discharge Monitoring Report (DMR) will include the following statement as a certification of compliance when the Credit Generating Practice is operating in a manner consistent with the Plan:

> "I certify that to the best of my knowledge that the management practices identified in the approved water quality trading plan as the source of phosphorus credits is installed, established and properly maintained."

F. Notification of Failure to Generate Credits

The Village will notify DNR by telephone call to DNR's regional wastewater compliance engineer within 24 hours or next business day of becoming aware that phosphorus credits used or intended for use by Village are not being generated as outlined in this Water Quality Trading Plan.

The Village will submit a written notification within five days after the Village recognizes that the phosphorus credits are not being generated as outlined in the Trading Plan. DNR may waive the requirement for submittal for a written notice within five days and instruct the Village to submit the written notice with the next regularly scheduled monitoring report required by Village's WPDES Permit.

The written notice will contain a description of how and why the TP credits are not being generated as outlined in the Water Quality Trading Plan, the steps taken or planned to prevent reoccurrence of the identified problems and the length of time anticipated it will take to address the issue.

The Village will work to rectify the problem as laid out in the Operation and Maintenance Plans.

G. Conditions under which Management Practices May Be Inspected

Any DNR authorized officer, employee, or representative has the right to access and inspect the credit generating practice so long as the Village's trade agreement with the property owner(s) and this Water Quality Trading Plan remain in effect.

VII. Certification –

The undersigned hereby certifies that this Water Quality Trading Plan is accurate and correct to the best of his knowledge.

Village of Avoca Wastewater Treatment Facility

By: Veronica Harris

Ronee Harris
Village President
Village of Avoca
401 Wisconsin Street
Avoca, WI 53506
Telephone: (608) 532-6831

Attachment #1

State of Wisconsin
Department of Natural Resources
101 South Webster Street
Madison WI 53707-7921
dnr.wi.gov

Notice of Intent to Conduct Water Quality Trading

Form 3400-206 (1/14)

Notice: Pursuant to s. 283.84, Wis. Stats., and ch. NR 217 Wis. Adm. Code, this form must be completed by any WPDES permittee that is using water quality trading as a method of complying with a permit limitation. Failure to complete this form would not result in penalties. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31 - 19.39, Wis. Stats.).

Applicant Information

Permittee Name	Permit Number	Facility Site Number
Village of Avoca	WI- 0060151-09-1	

Facility Address	City	State	ZIP Code
Lagoon Road	Avoca	WI	53506

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Jordan Fure (Delta 3 Eng.)	875 South Chestnut Street	Platteville	WI	53818

Project Name
Proposed 2024 Stream Improvements - Morrey Creek

Receiving Water Name	Parameter(s) being traded	HUC 12(s)
Morrey Creek	Total Phosphorus	070700051206

Is the permittee in a point or nonpoint source dominated watershed? (See PRESTO results - http://dnr.wi.gov/topic/surfacewater/presto.html)
- ○ Point source dominated
- ◉ Nonpoint source dominated

Credit Generator Information

Credit generator type (select all that apply):
- ☐ Permitted Discharge (non-MS4/CAFO)
- ☐ Permitted MS4
- ☐ Permitted CAFO
- ☒ Urban nonpoint source discharge
- ☒ Agricultural nonpoint source discharge
- ☐ Other - Specify: _____

Are any of the credit generators in a different HUC 12 than the applicant?
- ○ Yes; HUC 12: _____
- ◉ No
- ○ Unsure

Are any of the credit generators downstream of the applicant?
- ○ Yes
- ◉ No
- ○ Unsure

Will a broker/exchange be used to facilitate trade?
- ○ Yes; Name: _____
- ◉ No
- ○ Unsure

Point to Point Trades (Traditional Municipal / Industrial Discharge, MS4, CAFO)

Discharge Type	Permit Number	Name	Contact Address	Is the point source credit generator currently in compliance with their permit requirements?
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure

Point to Nonpoint Trades (Non-permitted Agricultural, Non-Permitted Urban, etc.)

List the practices that will be used to generate credits:

Streambank Stabilization

Method for quantifying credits generated:

- ☐ Monitoring
- ☒ Modeling, Names: NRCS Streambank Erosion Estimator
- ☐ Other: _____

Projected date credits will be available: 06/30/2024

The preparer certifies all of the following:

- I am familiar with the specifications submitted for this application, and I believe all applicable items in this checklist have been addressed.
- I have completed this document to the best of my knowledge and have not excluded pertinent information.

Signature of Preparer	Date Signed
[signature]	10-2-2023

Authorized Representative Signature

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision. Based on my inquiry of those persons directly responsible for gathering and entering the information, the information is, to the best of my knowledge and belief, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Representative	Date Signed
[signature]	10/5/23

Attachment #2

State of Wisconsin
Department of Natural Resources
101 South Webster Street
Madison WI 53707-7921
dnr.wi.gov

Water Quality Trading Checklist

Notice: Pursuant to s. 283.84, Wis. Stats., this form must be completed by any WPDES permittee that intends to pursue pollutant trading as a method of complying with a permit limitation. Failure to complete this form would not result in penalties. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31 - 19.39, Wis. Stats.).

Applicant Information

Permittee Name	Permit Number	Facility Site Number
Village of Avoca	WI- 0060151-09-1	

Facility Address	City	State	ZIP Code
Lagoon Road	Avoca	WI	53506

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Jordan Fure (Delta 3 Eng.)	875 South Chestnut Street	Platteville	WI	53818

Project Name
Proposed 2024 Stream Improvements - Morrey Creek

Receiving Water Name	Parameter(s) being traded	HUC 12(s)
Morrey Creek	Total Phosphorus	070700051206

Credit Generator Information

Credit generator type (select all that apply):

- ☐ Permitted Discharge (non-MS4CAFO)
- ☐ Permitted MS4
- ☐ Permitted CAFO
- ☒ Urban nonpoint source discharge
- ☒ Agricultural nonpoint source discharge
- ☐ Other - Specify: _____

Are any of the credit generators in a different HUC 12 than the applicant?
- ○ Yes; HUC 12: _____
- ◉ No

Are any of the credit generators downstream of the applicant?
- ○ Yes
- ◉ No

Will a broker/exchange be used to facilitate trade?
- ○ Yes *(include description and contact information in WQT plan)*
- ◉ No

Point to Point Trades (Traditional Municipal / Industrial, MS4, CAFO)

Are each of the point source credit generators identified in this section in compliance with their WDPES permit requirements?
- ○ Yes
- ○ No

Discharge Type	Permit Number	Name	Contact Information	Trade Agreement Number
○ Traditional ○ MS4 ○ CAFO				
○ Traditional ○ MS4 ○ CAFO				
○ Traditional ○ MS4 ○ CAFO				
○ Traditional ○ MS4 ○ CAFO				
○ Traditional ○ MS4 ○ CAFO				

Point to Point Trades (Traditional Municipal / Industrial, MS4, CAFO) *cont.*

Does plan have a narrative that describes:			Plan Section
a. Summary of discharge and existing treatment including optimization	◯ Yes	◯ No	
b. Amount of credit being generated	◯ Yes	◯ No	
c. Timeline for credits and agreements	◯ Yes	◯ No	
d. Method for quantifying credits	◯ Yes	◯ No	
e. Tracking and verification procedures	◯ Yes	◯ No	
f. Location of credit generator in proximity to receiving water and credit user	◯ Yes	◯ No	
g. Other: _____	◯ Yes	◯ No	

Point to Nonpoint Trades (Non-Permitted Urban, Agricultural, Other)

Discharge Type	Practices Used to Generate Credits	Method of Quantification	Trade Agreement Number	Have the practice(s) been formally registered?
◯ Urban NPS ◉ Agricultural NPS ◯ Other	Streambank Stabilization	NRCS Streambank Erosion Estimator		◯ Yes ◉ No ◯ Only in part
◯ Urban NPS ◯ Agricultural NPS ◯ Other				◯ Yes ◯ No ◯ Only in part
◯ Urban NPS ◯ Agricultural NPS ◯ Other				◯ Yes ◯ No ◯ Only in part
◯ Urban NPS ◯ Agricultural NPS ◯ Other				◯ Yes ◯ No ◯ Only in part
◯ Urban NPS ◯ Agricultural NPS ◯ Other				◯ Yes ◯ No ◯ Only in part
◯ Urban NPS ◯ Agricultural NPS ◯ Other				◯ Yes ◯ No ◯ Only in part
◯ Urban NPS ◯ Agricultural NPS ◯ Other				◯ Yes ◯ No ◯ Only in part
◯ Urban NPS ◯ Agricultural NPS ◯ Other				◯ Yes ◯ No ◯ Only in part

Does plan have a narrative that describes:			Plan Section
a. Description of existing land uses	◉ Yes	◯ No	Section IV
b. Management practices used to generate credits	◉ Yes	◯ No	Section IV
c. Amount of credit being generated	◉ Yes	◯ No	Section IV
d. Description of applicable trade ratio per agreement/management practice	◉ Yes	◯ No	Section IV
e. Location where credits will be generated	◉ Yes	◯ No	Section III
f. Timeline for credits and agreements	◉ Yes	◯ No	Section V
g. Method for quantifying credits	◉ Yes	◯ No	Section IV

Does plan have a narrative that describes:			Plan Section
h. Tracking procedures	◉ Yes	○ No	Section IV
i. Conditions under which the management practices may be inspected	◉ Yes	○ No	Section VI
j. Reporting requirements should the management practice fail	◉ Yes	○ No	Section VI
k. Operation and maintenance plan for each management practice	◉ Yes	○ No	Section IV
l. Location of credit generator in proximity to receiving water and credit user	◉ Yes	○ No	Section III
m. Practice registration documents, if available	○ Yes	◉ No	
n. History of project site(s)	◉ Yes	○ No	Section IV
o. Other: _____	○ Yes	○ No	

The preparer certifies all of the following:

- I am familiar with the specifications submitted for this application, and I believe all applicable items in this checklist have been addressed.
- I have completed this document to the best of my knowledge and have not excluded pertinent information.
- I certify that the information in this document is true to the best of my knowledge.

Signature of Preparer	Date Signed
Jordan Jones	10-2-2023

Authorized Representative Signature

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision. Based on my inquiry of those persons directly responsible for gathering and entering the information, the information is, to the best of my knowledge and belief, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Representative	Date Signed
Adam Sur	10/5/23

Attachment #3

Location Map

Legend

- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water

Notes

Village of Avoca

0.7 0 0.37 0.7 Miles

NAD_1983_HARN_Wisconsin_TM

1: 23,760

Attachment #4

Village of Avoca
Sanitary Sewer System Map

Existing Wastewater Treatment Facility

6" Force Main To Wastwater Treatment Facility

Match Line

Match Line

6" Force Main To Wastwater Treatment Facility

Lagoon Road

North First Street

Cleanout

Cleanout

Mh#3-5

Mh#3-4

Mh#3-3

Mh#3-2

Mh#3-1

Mh#2-28

Lift Station #3

Mh#2-27

Mh#2-26

Mh#2-25

West Lake Shore Drive

Mh#2-24

See Above for East Lake Drive

Mh#2-24

Mh#2-18

East Lake Shore Drive

Mh#2-23

Mh#2-19

Mh#2-20

Mh#2-21

Mh#2-22

Mh#2-15

Campground Bath House

Mh#2-17

Mh#2-16

Mh#2-15

Locust Street

Cleanout

Mh#2-8

Mh#2-1

2 Cleanouts

Lift Station #2

Mh#2-9

33' of 8" Sewer

Mh#2-10

Mh#2-11

33' of 8" Sewer

Mh#2-12

Mh#2-13

Mh#2-14

North Seventh Street

North Eighth Street

Mh#2-2

Mh#2-3

Mh#2-4

Mh#2-7

Mh#2-6

Mh#1-58

Mh#1-59

Mh#1-60

Mh#1-61

Mh#1-62

Clyde Street

Mh#1-63

Mh#1-65

Mh#1-67

Mh#1-68

Mh#1-64

Mh#1-66

Market Street

Mh#1-57

FMV #1

60' Force Main Casing

Wisconsin Southern Railroad

60' Sewer Casing

6" Force Main To Wastwater Treatment Facility

Front Street

Mh#1-49

Mh#1-53

Mh#1-56

Mh#1-55

4" Service w/ (2) Cleanouts

Mh#1-7

Mh#1-5

Mh#1-45

Mh#1-46

Mh#1-47

Mh#1-51

Mh#1-50

Mh#1-48

Mh#1-52

Mh#1-54

Main Street/S.T.H. '133'

Mh#1-6

Mh#1-4

Mh#1-44

Mh#1-19

Mh#1-15

Mh#1-26

Mh#1-33

Mh#1-37

Mh#1-8

Mh#1-3

First Street

Second Street

Third Street

Fourth Street

Fifth Street

Sixth Street

Seventh Street

Eighth Street

Mh#1-1

Mh#1-9

Wisconsin Street

Mh#1-2

Mh#1-14

Mh#1-18

Mh#1-25

Mh#1-32

Mh#1-36

Mh#1-41

Earthen Berm

Patten Street

Lift Station #1

Mh#1-10

Mh#1-16

Mh#1-20

Mh#1-27

Mh#1-34

Mh#1-38

Mh#1-42

Mh#1-12

Mh#1-40

Mh#1-35

Mh#1-39

Mh#1-13

Mh#1-11

Mh#1-17

Mh#1-23

Mh#1-21

Mh#1-22

Mh#1-28

William Street

Mh#1-43

Mh#1-29

Mh#1-24

Mh#1-29A

Riviera Street

Mh#1-31

Mh#1-30

Legend

Mh#1-1

- Manhole
- Lift Station
- 4" Force Main
- 6" Force Main
- 4" Sanitary Sewer Services
- 8" Sanitary Sewer Main

0 200' 400' 800'

Map was Prepared by:

DELTA 3
EVERY ANGLE COVERED

PROFESSIONAL CIVIL, MUNICIPAL, & STRUCTURAL ENGINEERING • ARCHITECTURE
GRANT WRITING • LAND DEVELOPMENT • PLANNING & CADD SERVICES

875 SOUTH CHESTNUT STREET
PLATTEVILLE, WISCONSIN 53818
PHONE: (608) 348-5355

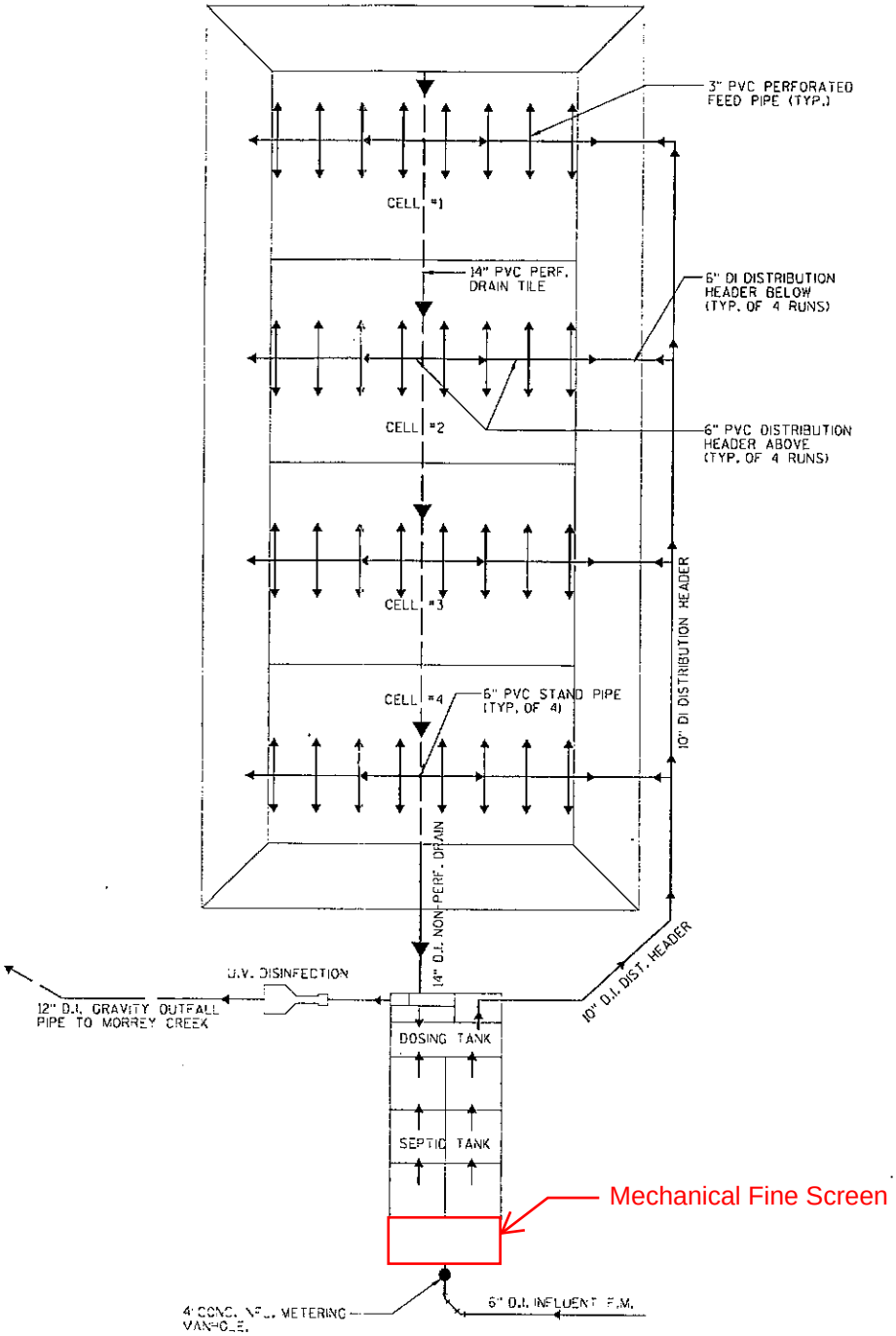
898 JACKSON STREET
DUBUQUE, IOWA 52001
PHONE: (563) 542-9005

Date: March, 31 2008
Revision Date: 5-4-2022

Drawn By: C. Jentz
Revised By: C.Coyier

G:\Projects\Avoca\Maps\Utilities Map.dwg_Sewer

Attachment #5



FLOW DIAGRAM
SCALE - 1" = 60'

FIGURE 9-1

TRANSPORTATION • MUNICIPAL • REMEDIATION
DEVELOPMENT • ENVIRONMENTAL
1230 South Boulevard Baraboo, WI 53913
608-356-2771 1-800-362-4506 Fax: 608-356-2770
© MSA PROFESSIONAL SERVICES
MSA PROFESSIONAL SERVICES

NO.	DATE	REVISION	BY

PROJECT NO.: 259574
DATE: JANUARY, 1997
SCALE: 1" = 60'
F.B.:
DRAWN BY: TJH
CHECKED BY:
CADD FILE NO.: 259455/A0M91
PLOT DATE:
PLOT TIME:

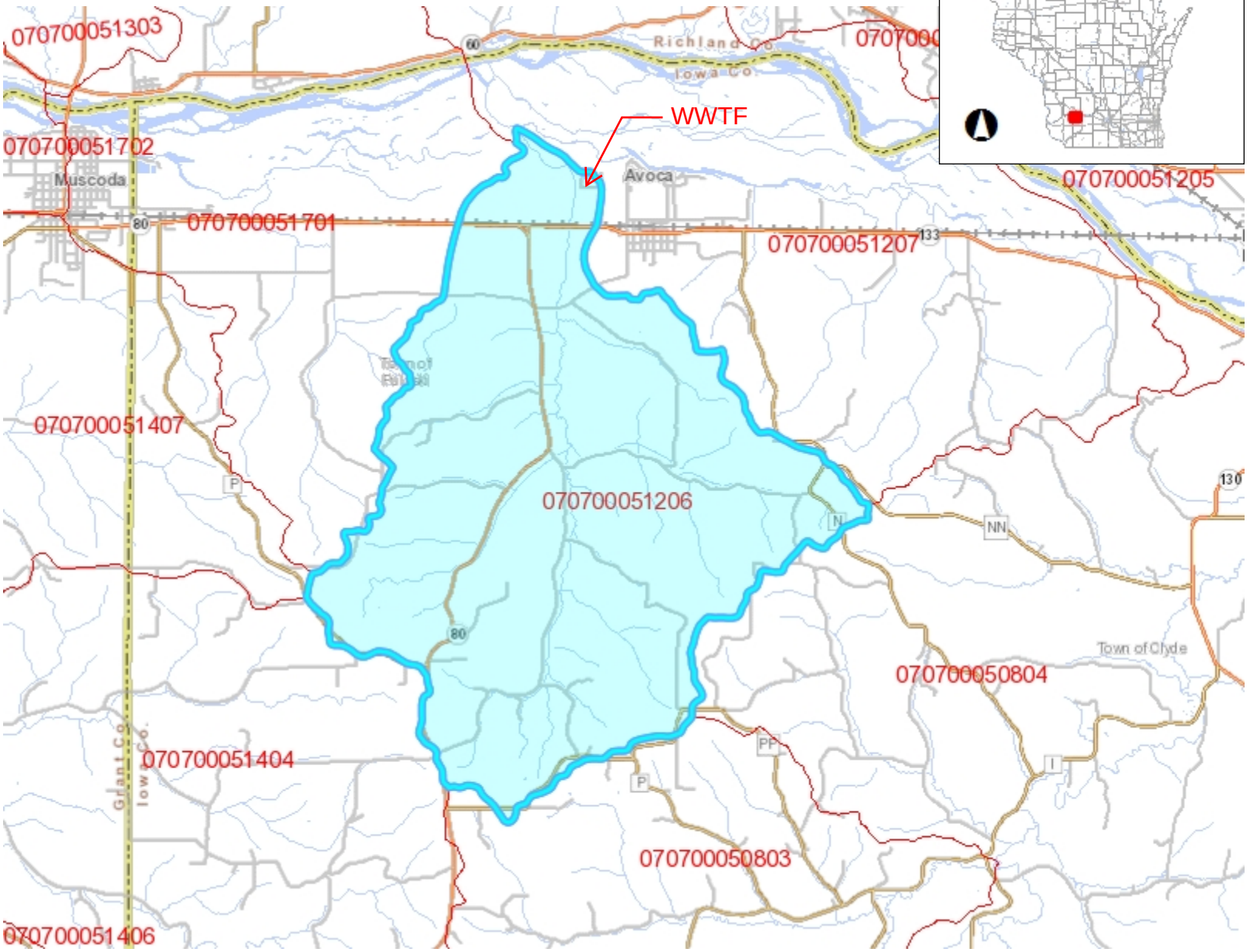
SCHEMATIC FLOW DIAGRAM
VILLAGE OF AVOCA
WASTEWATER TREATMENT FACILITIES
IOWA COUNT, WISCONSIN

FILE NO.
E25-185

PAGE
9-5

Attachment #6

HUC-12 Watershed Map



Legend

- 12-digit HUCs (Subwatersheds)
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water

Notes

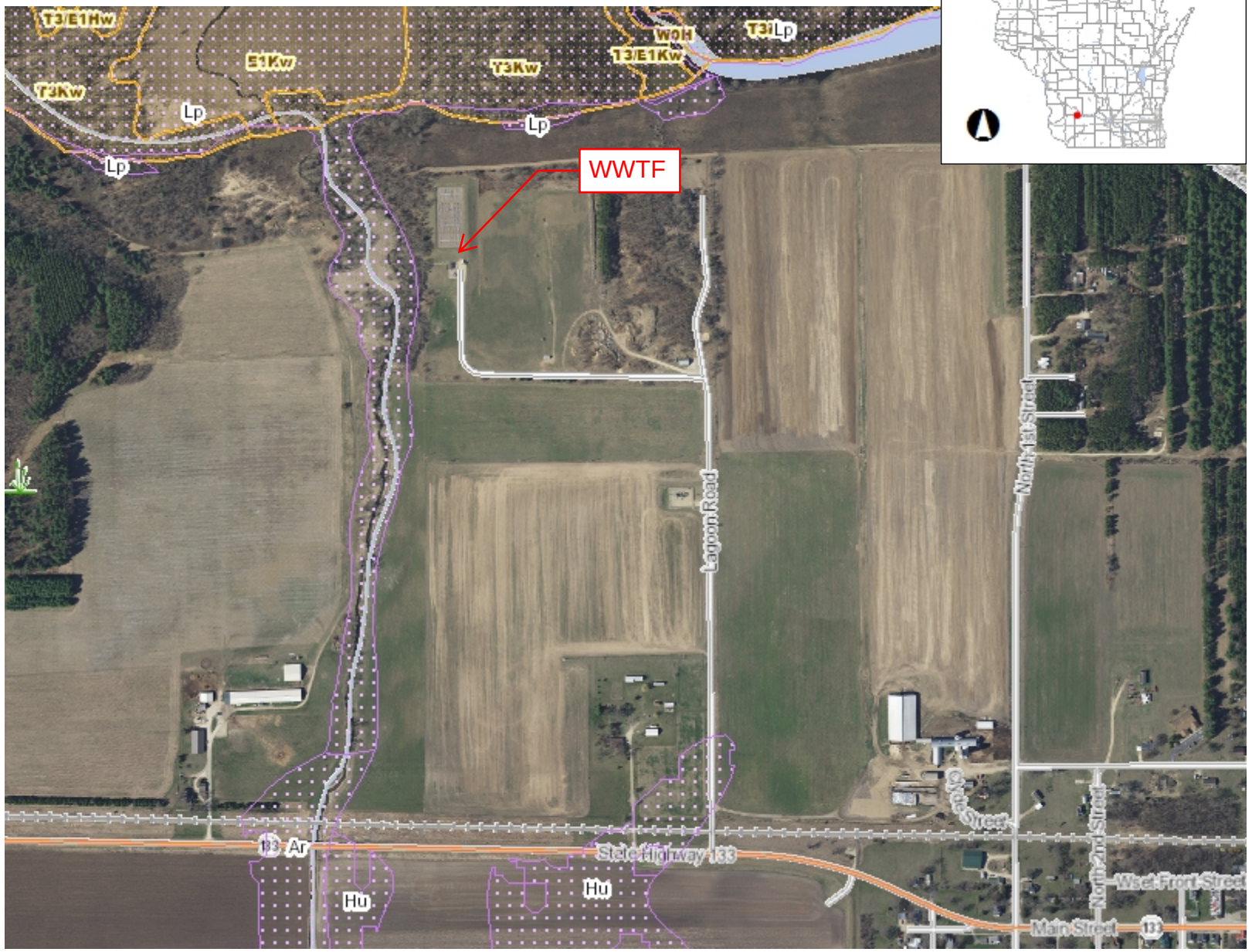
3.0 0 1.50 3.0 Miles

NAD_1983_HARN_Wisconsin_TM

1: 95,040

Attachment #7

Wetland Map



Legend

- Wetland Indicators
- Wetland Class Areas
- Wetland Class Points
  - Dammed pond
  - Excavated pond
  - Filled/drained wetland
  - Wetland too small to delineate
  - Filled excavated pond
- Filled Points
- Wetland Class Areas
- Filled Areas
- Wetland Class Areas
- Wetland Class Points
  - Dammed pond
  - Excavated pond
  - Filled/drained wetland
  - Wetland too small to delineate
  - Filled excavated pond
- Filled Points
- Wetland Class Areas
- Filled Areas
- Wetland Identifications and Confirmations
- NRCS Wetspots
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads

Notes

Village of Avoca

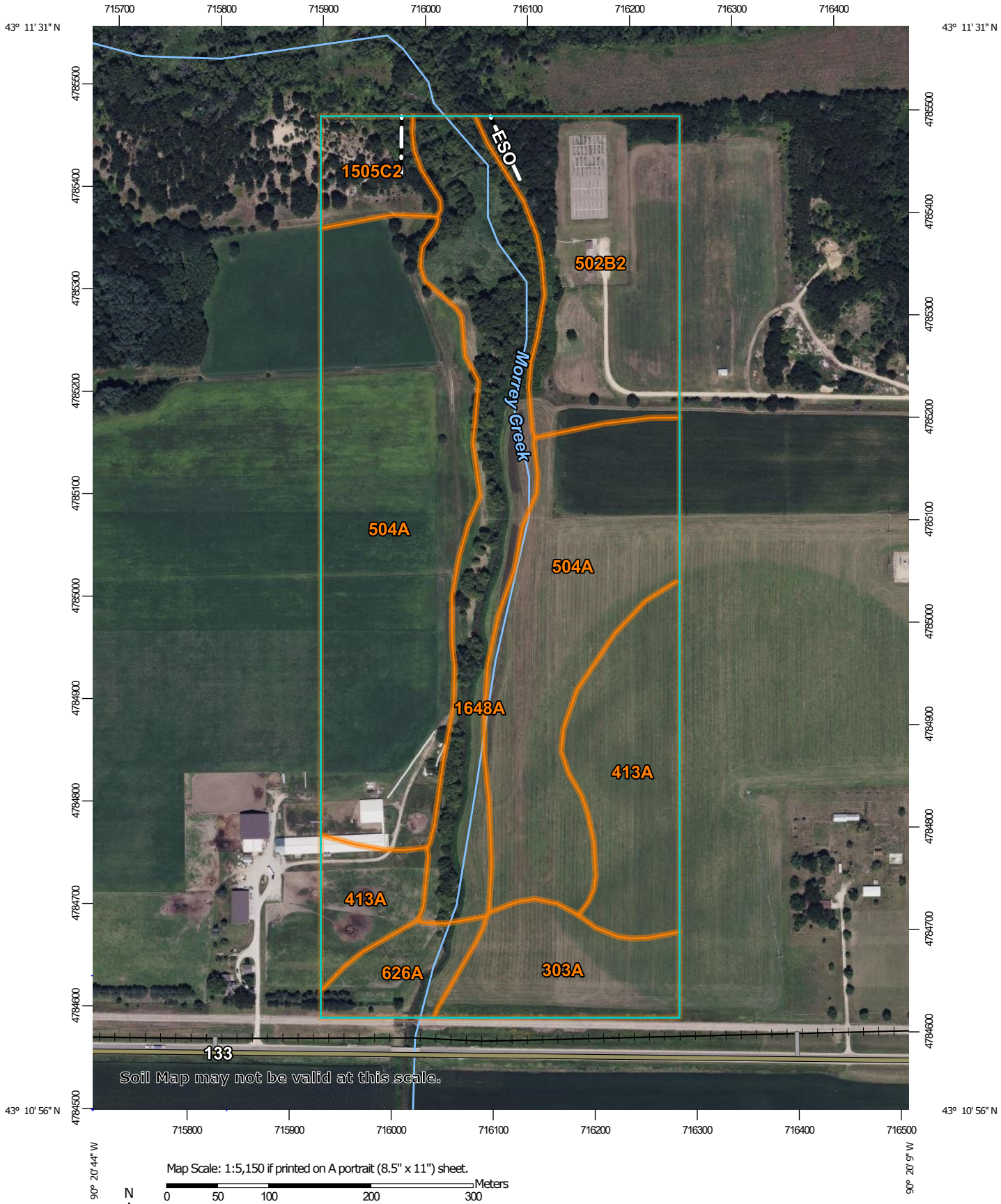
0.3 0 0.13 0.3 Miles

NAD_1983_HARN_Wisconsin_TM

1: 7,920

Attachment #8

Soil Map—Iowa County, Wisconsin
(Project Location Soil Map)



Map Scale: 1:5,150 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Iowa County, Wisconsin
Survey Area Data: Version 18, Sep 8, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 2, 2022—Sep 28, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
303A	Boguscreek silt loam, 0 to 3 percent slopes, occasionally flooded	5.1	6.6%
413A	Rasset sandy loam, 0 to 3 percent slopes	9.9	12.9%
502B2	Chelsea fine sand, 2 to 6 percent slopes, moderately eroded	11.3	14.7%
504A	Sparta loamy fine sand, 0 to 3 percent slopes	33.4	43.5%
626A	Arenzville silt loam, 0 to 3 percent slopes, occasionally flooded	2.5	3.3%
1505C2	Sparta-Blownout land complex, 0 to 15 percent slopes	2.5	3.3%
1648A	Northbend-Ettrick silt loams, 0 to 3 percent slopes, frequently flooded	12.0	15.7%
Totals for Area of Interest		**76.8**	**100.0%**

ROCK RIVER LABORATORY, INC.
AGRICULTURAL ANALYSIS

710 Commerce Drive
PO Box 169
Watertown, WI 53094

920-261-0446 phone
920-261-1365 fax
www.rockriverlab.com

Insight FS Darlington, WI - Total Phosphorus Analysis 03/03/2023

Field ID	Sample ID	Total P (ppm)
Avoca	15	429.4
Avoca	17	464.3
Avoca	19	638.8
Avoca	21	286.5
Avoca	23	485.8
Avoca	25	252
Avoca	27	494.9
Avoca	1	423.3
Avoca	3	504.5
Avoca	5	444.6
Avoca	9	565.8
Avoca	7	496.9
Avoca	11	469.9
Avoca	13	532.9
Avoca	29	737.6
Avoca	31	317.6

ROCK RIVER LABORATORY, INC.
AGRICULTURAL ANALYSIS

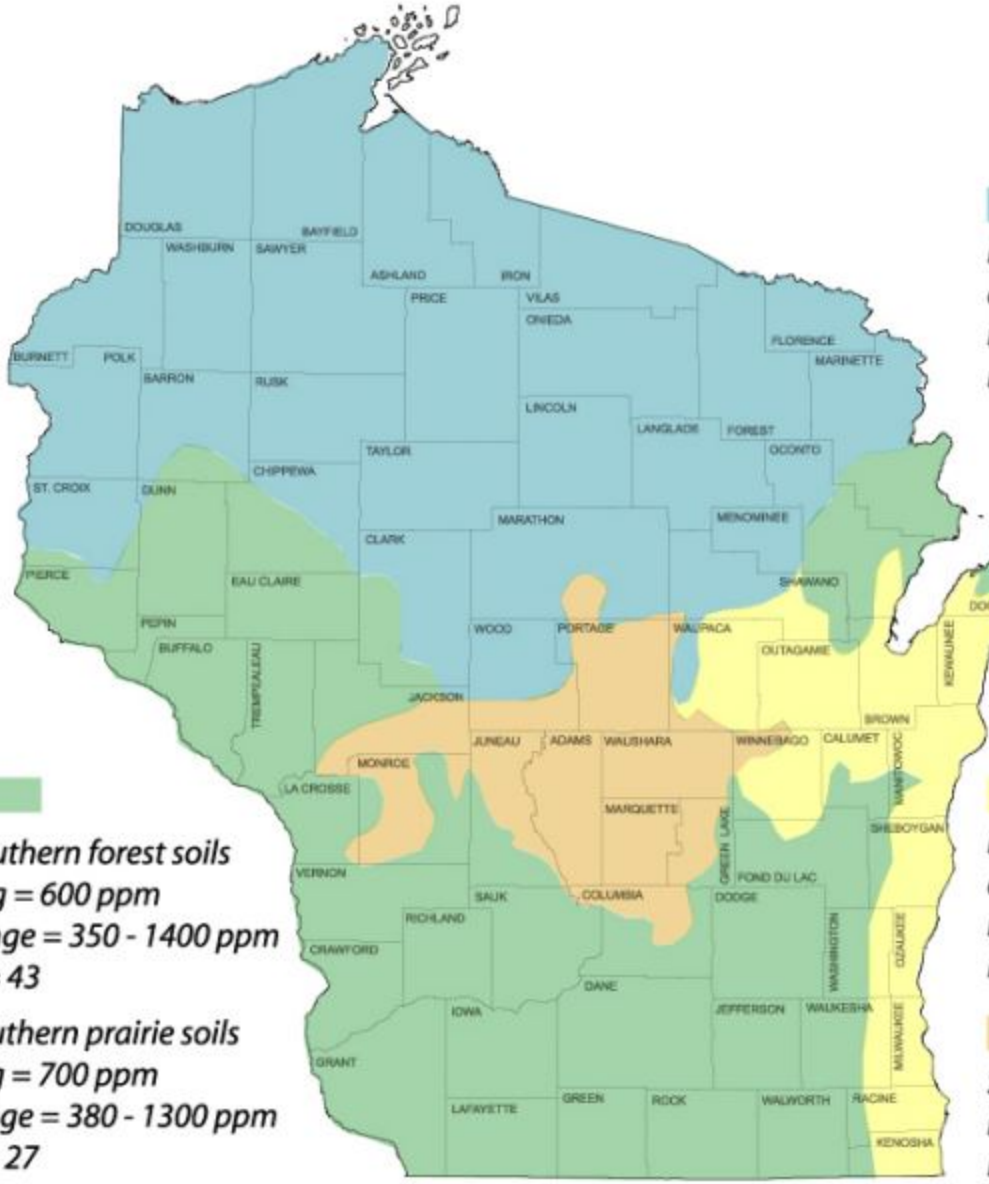
710 Commerce Drive
PO Box 169
Watertown, WI 53094

Total Phosphorus Analysis 06/10/2024

Delta 3 Engineering

Field ID	Sample ID	Total P (ppm)
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
Avoca	C	294.5
Avoca	E	276
Avoca	B	79.22
Avoca	D	153.6
Avoca	A	153.7
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

Soil Total P



Northern loamy soils
avg = 540 ppm
range = 480-580 ppm
n = 4

Southern forest soils
avg = 600 ppm
range = 350 - 1400 ppm
n = 43

Southern prairie soils
avg = 700 ppm
range = 380 - 1300 ppm
n = 27

Eastern red soils
avg = 950 ppm
range = 430 - 2820 ppm
n = 12

Sandy soils
range = 250 - 400 ppm
n = 2

Organic soils: range = 1330 - 1350 ppm, n = 2

Attachment #9

Photo	Station Number
1	133+00
2	131+00
3	129+50
4	125+00
5	123+75
6	122+25
7	118+50
8	114+50
9	113+50
10	111+75
11	111+50
12	110+25
13	106+25
14	104+25
15	102+50

STREAM SITES WITH DESCRIPTIONS
TABLE OF CONTENTS

II. Introduction

The lateral recession rate of the eroding bank is a critical component for the NRCS Streambank Erosion Estimator. The following documentation provides the justification for the lateral recession rates used in the NRCS Streambank Erosin Estimator. Lateral recession rate was estimated based on the photos provided, description, and on site evaluation. The following includes representative photos of the Project Extents to be stabilized through installation of Best Management Practices (BMPs).

III. Morrey Creek – Reach 1

Image 1 - Severe undercut with vegetative overhang

Image 2 - Severe undercut with vegetative overhang

Image 3 - Severe undercut with vegetative overhang

Image 4 - Severe undercut with vegetative overhang

Image 5 - Severe undercut with vegetative overhang

Image 6 - Severe undercut with vegetative overhang

IV. Morrey Creek – Reach 2

Image 7 - Severe undercut with vegetative overhang

Image 8 - Severe undercut with slump, vegetative overhang, and fallen tree

Image 9 - Severe undercut with slump, vegetative overhang, and fallen trees

Image 10 - Severe undercut with slump, vegetative overhang, and fallen trees

Image 11 - Severe undercut with slump, vegetative overhang, exposed roots, and fallen trees

Image 12 - Severe undercut with slump and vegetative overhang

v. Morrey Creek – Reach 3

Image 13 - Severe undercut with slump, vegetative overhang, and exposed roots

Image 14 - Severe undercut with slump, vegetative overhang, and fallen trees

Image 15 - Severe undercut with slump, vegetative overhang, exposed roots and fallen trees

Attachment #10

NRCS Excel Workbook Estimating 'Other' Erosion Types June 2006

Annual soil loss predictions for conservation planning purposes are made with current soil loss prediction technology (RUSLE2). RUSLE2 estimates sheet, rill and interrill erosion. Erosion that is seasonal in nature and caused by concentrated flow, however, is not predicted by RUSLE2.

This workbook provides conservation planners with simple tools and processes to help estimate the amount of erosion occurring in ephemeral gullies, classic gullies and on streambank erosion sites.

Definitions:

Rill Erosion: consists of the removal of soil by concentrated water running through little streamlets, or headcuts. Detachment in a rill occurs if the sediment in the flow is below the amount the load can transport and if the flow exceeds the soil's resistance to detachment. As detachment continues or flow increases, rills will become wider and deeper. Rills may be of any size but are usually less than four inches deep. Rills are:

<> generally parallel on the slope, but may converge,
<> generally of uniform spacing and dimension,
<> generally appear at different locations on the landscape from year to year,
<> generally shorter than ephemeral cropland gullies,
<> usually end at a concentrated flow channel, or an area where the slope flattens and deposition occurs,
<> are on the same portion of the slope that is used to determine the length of slope (L) for RUSLE2,
<> many small, but conspicuous channels running in the direction of slope gradient

Rill erosion is considered in the RUSLE2 calculations.

Ephemeral Gully Erosion: Small erosion channels formed on crop fields as a result of concentrated flow of runoff water. These channels are routinely eliminated by tillage of the field but return following subsequent runoff events. Ephemeral Gullies are small enough to be eliminated (temporarily) with the use of typical farm tillage equipment and they:

<> recur in the same area of concentrated flow each time they form,
<> frequently form in well-defined depressions in natural drainage ways,
<> are generally wider, deeper, and longer than the rills in the field,

Ephemeral Gullies are **not** calculated by the RUSLE2 program.

Gully Erosion: Permanent gullies are formed when channel development has progressed to the point where the gully is too wide and too deep to be tilled across. These channels carry large amounts of water after rains and deposit eroded material at the foot of the gully. They disfigure landscape and make the land unfit for growing crops. Gullies:

<> may grow or enlarge from year to year by head cutting and lateral enlarging,
<> often occur in depressions or natural drainage ways,
<> may begin as ephemeral gullies that were left in the field untreated,
<> may, over time, become partially stabilized by grass, weeds or woody vegetation,

Gully erosion is not calculated by the RUSLE2 program.

Streambank Erosion: The wearing away of streambanks by flowing water. The removal of soil from streambanks is typically caused by the direct action of stream flow and/or wind/wave action, typically occurring during periods of high flow. Streambank erosion:

<> is a natural process that generally increases when unprotected streambanks (e.g. no woody vegetation) are subject to the actions of flowing water and ice damage.

<> is a common occurrence on many Vermont river channels that are experiencing geomorphic adjustments

---

The soil loss from ephemeral gullies, gullies and streambank erosion areas can be estimated by calculating the volume of soil removed by erosion processes. The volume of soil loss can be multiplied by the typical unit weight of the soil (based on soil texture) which is eroded. Approximate soil unit weights are expressed below[1]:

Soil Texture	Estimated Dry Density lb/ft^3
Gravel	110
Sand	105
Loamy Sand	100
Sandy Loam	100
Fine Sandy Loam	100
Sandy Clay Loam	90
Silt Loam	85
Silty Clay Loam	85
Silty Clay	85
Clay Loam	85
Organic	22

Procedure for estimating Ephemeral Soil Erosion:

The following formula will be used to calculate annual estimated ephemeral gully erosion:

$$\frac{\text{Ephemeral Gully } \mathbf{Length} \times \text{Gully Average } \mathbf{Width} \times \text{Gully Average } \mathbf{Depth}}{2000} \times \text{Soil Weight (lbs/ft}^3\text{)} \times \text{Occurrences per Year} = \mathbf{Estimated} \text{ Soil Loss (Tons per Year)}$$

***** Ephemeral gully erosion may reform multiple times per year, and under certain conditions it may not form in a given year. The voided volume which would be calculated after a runoff event is not necessarily representative of an annual rate, but is representative of only the specific event. This erosion can be calculated for individual storms and can be summed for a yearly estimate.

1 Data from published soil surveys, laboratory data, and soil interpretation record are to be used where available. Parent materials, soil consistency, soil structure, pore space, soil texture, and coarse fragments all influence unit weight.

Procedure for estimating Gully Soil Erosion:

The following formula will be used to calculate annual estimated classic gully erosion:

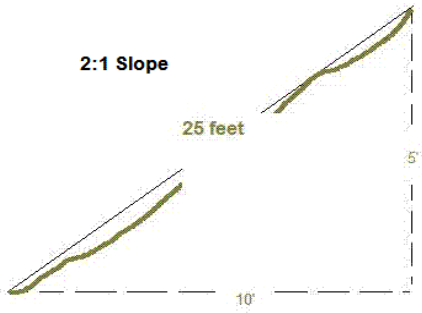
$$\frac{\text{Gully } \textbf{Length} \text{ X (Average } \textbf{Width} \text{ X Average } \textbf{Depth} \text{ X 0.5) X } \textbf{Soil Weight} \text{ (lbs/ft3)}}{2000} \; / \; \text{Formation Years} = \textbf{Estimated} \text{ Soil Loss Per Year (Tons)}$$

Procedure for estimating Streambank Soil Erosion (Direct Volume Method):

The following formula will be used to calculate annual estimated streambank erosion unless a field measurement procedure[2] is used:

$$\frac{\text{ing Bank } \textbf{Length} \text{ X Eroding Bank Height X Lateral Recession Rate (FT/YR) X Soil Weight (lb}}{2000} = \textbf{Estimated} \text{ Soil Loss Per Year (Tons)}$$

** Eroding bank height is measured along the bank, not the vertical height of bank. Example: if vertical height of an eroding streambank is 5 feet, and the bank is on a 2:1 slope, the total eroding bank distance is 25 feet -- 1/2 (Base X Height).



***The average annual recession rate is the thickness of soil eroded from a bank surface (perpendicular to the face) in an average year.

Stream bank erosion sometimes presents itself as a major occurance in a given year, whereas the same bank may not erode significantly for a period of years if no major runoff events occur. Recession rates need to be calculated as an average of years when erosion does and does not occur. Recession rate is not calculated as the erosion occurring after a single event.

Use available resources to assist in the estimation of recession rate: use past and present aerial photography, old survey records, and any other information that helps to determine the bank condition at known times in the past. When such information is lacking or insufficient, field observations and professional judgement are needed to estimate recession rates.
It is often not possible to directly measure recession rates in the field. Therefore, the following table has been included which relates recession rates to narrative descriptions of banks eroding at different rates (Table from NRCS Wisconsin guidance).

Lateral Recession Rate (ft/yr)	Category	Description
0.01-0.05	Slight	Some bare bank but active erosion not readily apparent. Some rills but no vegetative overhang. No exposed tree roots.
0.06-0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang. Some exposed tree roots but no slumps or slips.
0.3-0.5	Severe	Bank is bare with rills and severe vegetative overhang. Many exposed tree roots and some fallen trees and slumps or slips. Some changes in cultural features such as fence corners missing and realignment of roads or trails. Channel cross section becomes U-shaped as opposed to V-shaped.
0.5+	Very Severe	Bank is bare with gullies and severe vegetative overhang. Many fallen trees, drains and culverts eroding out and changes in cultural features as above. Massive slips or washouts common. Channel cross section is U-shaped and stream course may be meandering.

2 The best way to quantify streambank erosion is to measure it directly in the field. The basic procedure in measuring streambank erosion is to survey, flag, or in some way fix a “before" image of the channel you are evaluating in order to establish the baseline condition. Changes due to erosion can then be monitored over time by going back to the study area and re-measuring from the fixed reference points.
Channel cross-sections can be surveyed and plotted on a periodic basis to monitor change. Stakes or pins can be driven into channel banks flush with the surface. The amount of stake or pin exposed due to erosion is the amount of change at the streambank erosion site between your times of observation.
The time required to monitor a site often precludes this method of data collection. The Direct Volume Method can be used to estimate streambank erosion at your site.

Acknowledgements: This Excel workbook was created as a planning tool for use by conservation planners. The basic format and content of the tool is a compilation of various similar tools, processes and procedures employed by NRCS in several states including: Indiana, Iowa, Kansas, Maryland, Michigan, Missouri, Nebraska, Oklahoma, South Dakota and Wisconsin. Some of the terminology in the 'Definitions' section of this Readme document closely mirrors these sources.

NRCS Streambank and Irrigation Ditch Erosion Estimator (Direct Volume Method)

Farmer / Cooperator Name: Village of Avoca
Tract Number: Varies
Evaluated By: J. Fure
Evaluation Date: August 9, 2024

Field Number	*Eroding Strmbnk Reach #; or Ditch Side/Bottom*	*Eroding Bank or Ditch Length (Feet)*	*Eroding Bank Height; or Ditch Bottom Width* (Feet)*	*Area of Eroding Strmbank or Ditch (FT^2)*	*Lateral or Ditch Bottom Recession Rate (Estimated) (FT / Year)*	*Estimated Volume (FT^3) Eroded Annually*	*Soil Texture*	*Approximate Pounds of Soil per FT^3*	*Estimated Soil Loss (Tons/Year)*	*Soil Total Phosphorus (ppm)*	*Estimated Phosphorus Loss (Pounds/Year)*
Drew Hostetler Easement	1L	400	11.30	4,520	0.30	1,356.0	Silt Loam	85	57.6	215	25
	2L	100	7.66	766	0.40	306.4	Silt Loam	85	13.0	295	8
	3L	225	7.29	1,640	0.30	492.1	Silt Loam	85	20.9	295	12
	4L	725	6.57	4,763	0.50	2,381.6	Silt Loam	85	101.2	117	24
	1R	240	6.24	1,498	0.40	599.0	Silt Loam	85	25.5	475	24
	2R	400	9.39	3,756	0.40	1,502.4	Silt Loam	85	63.9	531	68
	3R	100	8.09	809	0.50	404.5	Silt Loam	85	17.2	518	18
	4R	300	8.72	2,616	0.50	1,308.0	Silt Loam	85	55.6	501	56
	5R	225	6.92	1,557	0.50	778.5	Silt Loam	85	33.1	429	28
	6R	100	9.79	979	0.30	293.7	Silt Loam	85	12.5	447	11
	7R	225	9.46	2,129	0.50	1,064.3	Silt Loam	85	45.2	464	42
	8R	100	9.60	960	0.40	384.0	Silt Loam	85	16.3	639	21
	9R	100	5.31	531	0.50	265.5	Silt Loam	85	11.3	463	10
	10R	100	9.50	950	0.20	190.0	Silt Loam	85	8.1	287	5
	11R	100	7.09	709	0.50	354.5	Silt Loam	85	15.1	386	12
	12R	150	10.12	1,518	0.40	607.2	Silt Loam	85	25.8	486	25
	13R	375	7.82	2,933	0.50	1,466.3	Silt Loam	85	62.3	373	46
	14R	225	5.83	1,312	0.50	655.9	Silt Loam	85	27.9	616	34
	15R	500	12.34	6,170	0.40	2,468.0	Silt Loam	85	104.9	528	111
				TOTAL		16,877.8			**717**		**580**

Reach	ID	STA	Top of Bank Elevation	Bottom Bank/Water Elevation	Vertical Bank	Horizontal Bank	Bank Height
1L	22	113+10	696.35	691.01	5.3	16.3	17.15
1L	23	111+60	695.69	691.11	4.6	6.3	7.79
1L	24	111+00	694.74	690.68	4.1	8.0	8.97
AVERAGE					**4.66**	**10.20**	**11.30**
2L	25	109+90	695.62	689.22	6.4	4.2	7.66
AVERAGE					**6.40**	**4.20**	**7.66**
3L	26	108+90	694.75	690.42	4.3	5.7	7.16
3L	27	108+10	694.53	690.61	3.9	6.3	7.42
AVERAGE					**4.96**	**7.65**	**7.29**
4L	28	106+25	694.58	689.48	5.1	1.9	5.44
4L	29	105+25	694.90	689.10	5.8	2.2	6.20
4L	30	104+10	693.35	686.95	6.4	2.9	7.03
4L	31	102+50	693.89	686.59	7.3	2.2	7.62
AVERAGE					**6.15**	**2.30**	**6.57**

Reach	ID	STA	Top of Bank Elevation	Bottom Bank/Water Elevation	Vertical Bank	Horizontal Bank	Bank Height
1R	3	132+80	697.85	694.24	3.6	4.8	6.01
1R	4	132+10	699.72	695.30	4.4	3.9	5.89
1R	5	131+00	698.93	694.89	4.0	5.5	6.82
AVERAGE					**4.02**	**4.73**	**6.24**
2R	6	130+00	699.26	692.26	7.0	4.2	8.16
2R	7	129+10	699.49	689.49	10.0	4.4	10.93
2R	8	128+25	697.85	689.85	8.0	4.7	9.28
2R	9	127+00	699.06	691.06	8.0	4.5	9.18
AVERAGE					**8.25**	**4.45**	**9.39**
3R	10	126+25	698.72	690.72	8.0	1.2	8.09
AVERAGE					**8.00**	**1.20**	**8.09**
4R	11	125+00	698.57	688.57	10.0	4.0	10.77
4R	12	124+00	698.46	692.46	6.0	1.9	6.29
4R	13	122+75	698.12	690.12	8.0	4.3	9.08
AVERAGE					**8.00**	**3.40**	**8.72**
5R	14	121+90	698.07	691.07	7.0	1.6	7.18
5R	15	120+75	697.78	691.78	6.0	2.9	6.66
AVERAGE					**6.50**	**2.25**	**6.92**
6R	16	119+75	697.77	693.28	4.5	8.7	9.79
AVERAGE					**4.49**	**8.70**	**9.79**
7R	17	118+75	697.55	686.55	11.0	4.0	11.70
7R	18	117+60	697.22	691.22	6.0	2.6	6.54
AVERAGE					**8.50**	**3.30**	**9.12**
8R	19	116+20	697.10	691.10	6.0	7.5	9.60
AVERAGE					**6.00**	**7.50**	**9.60**
9R	20	115+30	696.70	691.70	5.0	1.8	5.31
AVERAGE					**5.00**	**1.80**	**5.31**
10R	21	114+30	696.68	694.30	2.4	9.2	9.50
AVERAGE					**2.38**	**9.20**	**9.50**
11R	22	113+40	696.41	689.41	7.0	1.1	7.09
AVERAGE					**7.00**	**1.10**	**7.09**
12R	23	111+75	696.10	689.90	6.2	8.0	10.12
AVERAGE					**6.20**	**8.00**	**10.12**
13R	24	111+00	695.85	688.25	7.6	3.1	8.21
13R	25	110+10	695.64	687.84	7.8	2.2	8.10
13R	26	108+80	695.13	689.53	5.6	2.7	6.22
13R	27	108+10	695.18	687.08	8.1	3.3	8.75
AVERAGE					**7.28**	**2.83**	**7.82**
14R	28	106+45	694.52	688.72	5.8	0.6	5.83
AVERAGE					**5.80**	**0.60**	**5.83**
15R	29	105+25	694.10	683.80	10.3	3.0	10.73
15R	30	104+10	694.01	683.51	10.5	8.2	13.32

15R	31	102+40	693.44	683.24	10.2	8.0	12.96
AVERAGE					**10.33**	**6.40**	**12.34**

Attachment #11

Water Quality Trading
Operation and Maintenance Plan

Introduction:
The Water Quality Trading (WQT) Operation and Maintenance (O&M) Plan is meant to be a working document and should be updated as new trading practices are implemented. Currently, the Operation and Maintenance Plan revolves around the Best Management Practice (BMP) construction along the Morrey Creek. The attached *BMP Inspection Form* should be completed during annual inspections of BMPs and following major storm events. Inspection forms shall be retained for at least five (5) years to ensure compliance with the WQT Plan.

Publicly Owned BMP:
Village representative to complete inspection form annually and following major storm events. The form will then be provided to the Maintenance Supervisor following inspection. The Village will address maintenance issues identified during inspection within 30 days. Substantial maintenance issues may require an extended timeframe for generation of plans, specifications, and a public bid process to perform the work. Inspections and O&M activities shall be reported in the annual WQT Report sent to the DNR.

Privately Owned BMP:
Village representative to complete inspection form annually and following major storm events. The form will then be provided to the Maintenance Supervisor following inspection. The Village will address maintenance issues identified during inspection within 30 days. Substantial maintenance issues may require an extended timeframe for generation of plans, specifications, and a public bid process to perform the work. Maintenance expenses will be incurred by either by the Village or Private Property Owner depending on agreement with the Village. The Private Property Owner will be allowed to perform maintenance activities at the expense of the Private Property Owner. Inspections and O&M activities shall be reported in the annual WQT Report sent to the DNR.

Quality Assurance:
Riprap gradation and composition shall be provided for each source of material. Streambank shaping and riprap shall be installed per the Iowa County Land Conservation Department and NRCS Standards. Contractors to supply rock that is approved by the NRCS and meets criteria in Wisconsin Construction Spec.9.

Installation:
- Staking provided by the Engineer.
- Do not place riprap over frozen or spongy subgrade surfaces.
- Place riprap as indicated on Construction Plans. Do not dump rip-rap over the bank.
- Blend riprap with existing bank.
- Spread soil out in a layer of less than 4” and seed down. Do not spread soil in wetlands.
- All disturbed areas and soil must be seeded and mulched.

Practice Registration:
The purpose of the “Water Quality Trading Management Practice Registration” form is to report to DNR that a management practice identified in the trading plan has been properly installed and is established and effective. This information will be used to track implementation progress, verify compliance and

perform audits, as necessary. A registration form should be submitted for every management practice that has been identified in the trading plan. If practices are established prior to trading plan submittal, registration forms may be submitted with the trading plan. Otherwise, registration forms should be submitted during the permit term as practices become effective or with the annual report. A blank *Water Quality Trading Management Practice Registration Form 3400-207* is attached and should be submitted following implementation of the trading practice.

Tracking Procedures:
The Village will track credits used monthly. The Village will report credit usage to the DNR on a monthly basis in the Discharge Monitoring Reports (DMRs). The annual report will summarize the 12 months of credit usage and credit generation. The Village will report to DNR any concern that they have that may result in a need to modify the trade agreement and/or this trade plan. For example, a need to generate additional credits based on discharge.

Inspections/Maintenance Considerations:

- A *BMP Inspection Form* is attached.
    - Site: As noted on Construction Plans
    - Condition of BMP: Excellent; Good; Fair; or Poor
    - Maintenance Estimate: Provide an estimate for how long the maintenance will take to complete or a dollar value for completion. This will help determine if the Village will perform the work or if the Village will hire another entity to perform the work.
    - Date Completed: Following completion of the required maintenance, input the date of completion.
    - Comments: Provide the required maintenance activity along with any other useful information. If the cell provided is not large enough for Comments, write "See Back of Sheet" and provide comments on the reverse side of the Form.
- Following installation, inspect the disturbed areas closely over the next few months to ensure that seeding grows.
- BMPs may settle or shift especially after flooding events or freeze/thaw.
- May need to control weed and brush growth.
- Inspect stabilized areas as needed.
- At a minimum, inspect after major storm events.
- If a BMP has been damaged, repair it promptly to prevent a progressive failure.
- If repairs are needed repeatedly at a location, evaluate the site to determine if the original design conditions have changed.

Routine Maintenance Items that can be performed by Village:

- Evaluate BMP condition
    - Reconstruct/replace BMPs that have settled, shifted, or washed out.
- Manage Vegetation
    - Remove invasive/noxious plants.
- Manage Garbage
    - Remove garbage and other debris that could otherwise impair the streambank stability.

Monthly Certification:
Each month, the Village will certify that the BMPs are maintained and operating in a manner consistent with this Water Quality Trading Plan or provide a statement noting noncompliance with this Plan. The monthly Discharge Monitoring Report (DMR) will include the following statement as a certification of compliance when the Credit Generating Practice is operating in a manner consistent with the Plan:

> "I certify that to the best of my knowledge that the management practices identified in the approved water quality trading plan as the source of phosphorus credits is installed, established and properly maintained."

Annual Inspection:
An annual inspection of the BMPs will be performed by a licensed Professional Engineer to ensure that the BMPs are functioning as intended in order to meet the requirements of the WQT Plan.

Noncompliance:
The Village will notify DNR by telephone call to DNR's regional wastewater compliance engineer within 24 hours or next business day of becoming aware that phosphorus credits used or intended for use by Village are not being generated as outlined in this Water Quality Trading Plan.

The Village will submit a written notification within five days after the Village recognizes that the phosphorus credits are not being generated as outlined in the Trading Plan. DNR may waive the requirement for submittal for a written notice within five days and instruct the Village to submit the written notice with the next regularly scheduled monitoring report required by Village's WPDES Permit.

The written notification should include:

- Description of noncompliance and cause.
- Period of noncompliance including dates and times.
- Schedule for attaining compliance including time and steps toward compliance.
- Plan to prevent reoccurrence of the noncompliance.

Notification of Trade Agreement Termination:
If a trade agreement or the trading plan needs to be terminated during the permit term, the permittee should submit a Notice of Termination to the wastewater engineer/specialist to inform DNR of the termination. DNR staff should use this information to determine if a permit modification is required due to the termination, the termination will result in non-compliance, or other permit actions are required due to the termination. When credits are reduced or eliminated for any reason, the permittee is still required to meet their WQBELs without any grace period. To prevent noncompliance with WQBELs, changes to trading plans must be addressed before credits are lost. Modifying the permit/trading plan will require at least 180 days. A blank *Notification of Water Trade Agreement Termination Form 3400-209* is attached and should be submitted to DNR prior to practice termination, no later than the submittal date of the annual report.

BMP Inspection Form

Date_____ Inspector_____

Reason for Inspection (circle one): Monthly / Precipitation Event / Other: _____

Last Inspection Photos Date: _____

(inspection photos should be taken annually at minimum) Photos Taken? ☐ Yes ☐ No

Reach	Condition of BMP	Required Maintenance	Maintenance Estimate (Time or Cost)	Comments

State of Wisconsin
Department of Natural Resources
101 South Webster Street
Madison WI 53707-7921
dnr.wi.gov

Water Quality Trading Management Practice Registration

Form 3400-207 (R 1/14)

Notice: Pursuant to s. 283.84, Wis. Stats., this form must be completed by any WPDES permittee that is using water quality trading as a method of complying with a permit limitation. Failure to complete this form would not result in penalties. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31 - 19.39, Wis. Stats.).

Applicant Information

Permittee Name	Permit Number WI-	Facility Site Number

Facility Address	City	State	ZIP Code

Project Contact Name (if applicable)	Address	City	State	ZIP Code

Project Name

Broker/Exchange Information (if applicable)

Was a broker/exchange be used to facilitate trade? ◯ Yes ◯ No

Broker/Exchange Organization Name	Contact Name

Address	Phone Number	Email

Trade Registration Information (Use a separate form for each trade agreement)

Type	Trade Agreement Number	Practices Used to Generate Credits	Anticipated Load Reduction	Trade Ratio	Method of Quantification
◯ Urban NPS ◯ Agricultural NPS ◯ Other					

County	Closest Receiving Water Name	Land Parcel ID(s)	Parameter(s) being traded

The preparer certifies all of the following:

- I have completed this document to the best of my knowledge and have not excluded pertinent information.
- I certify that the information in this document is true to the best of my knowledge.

Signature of Preparer	Date Signed

Authorized Representative Signature

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision. Based on my inquiry of those persons directly responsible for gathering and entering the information, the information is, to the best of my knowledge and belief, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Representative	Date Signed

Leave Blank – For Department Use Only

Date Received		Trade Docket Number
Entered in Tracking System ☐ Yes	Date Entered	Name of Department Reviewer

State of Wisconsin
Department of Natural Resources
101 South Webster Street
Madison WI 53707-7921
dnr.wi.gov

Notification of Water Trade Agreement Termination

Form 3400-209 (1/14)

Notice: Pursuant to s. 283.84, Wis. Stats., and ch. NR 217 Wis. Adm. Code, this form must be completed by any WPDES permittee that is using water quality trading as a method of complying with a permit limitation. Failure to complete this form would not result in penalties. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31 - 19.39, Wis. Stats.).

Applicant Information

Permittee Name	Permit Number WI-	Facility Site Number

Facility Address	City	State	ZIP Code

Project Contact Name (if applicable)	Address	City	State	ZIP Code

Project Name

Credit Generator Information

Credit generator type (select all that apply):

- ☐ Permitted Discharge (non-MS4/CAFO)
- ☐ Permitted MS4
- ☐ Permitted CAFO
- ☐ Urban nonpoint source discharge
- ☐ Agricultural nonpoint source discharge
- ☐ Other - Specify:

Trade Agreement number(s) to be terminated including affected land parcel ID(s):

Amount of trading credit being terminated	Effective date of termination

Reason for termination

Is this agreement being updated or replaced?

- ◯ Yes
- ◯ No
- ◯ Unsure

Will this termination result in non-compliance with the effective limit or other permit requirements?

- ◯ Yes; Name: _____
- ◯ No
- ◯ Unsure

The preparer certifies all of the following:

- I am familiar with the specifications submitted for this application, and I believe all applicable items in this checklist have been addressed.
- I have completed this document to the best of my knowledge and have not excluded pertinent information.

Signature of Preparer	Date Signed

Authorized Representative Signature

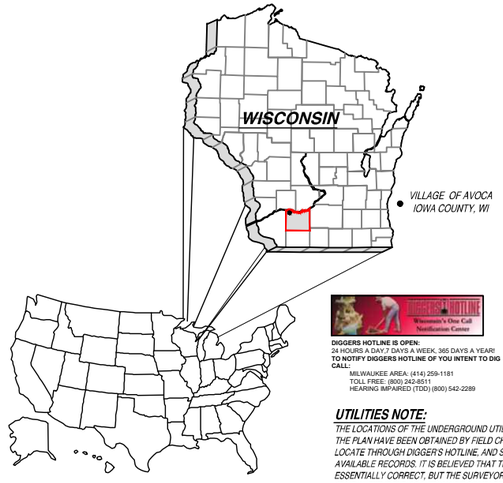
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision. Based on my inquiry of those persons directly responsible for gathering and entering the information, the information is, to the best of my knowledge and belief, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Representative	Date Signed

Attachment #12

PROPOSED 2024 STREAM IMPROVEMENTS - MORREY CREEK

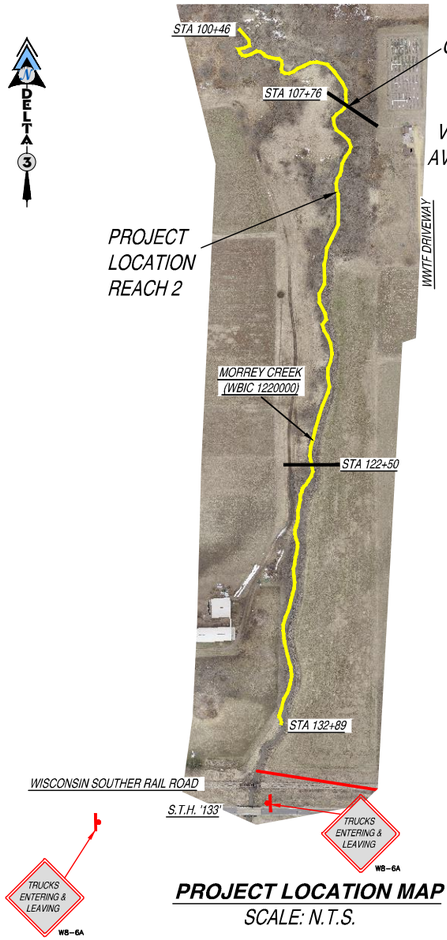
OWNER: VILLAGE OF AVOCA, WI



DIGGERS HOTLINE IS OPEN:
24 HOURS A DAY,7 DAYS A WEEK, 365 DAYS A YEAR!
TO NOTIFY DIGGERS HOTLINE OF YOU INTENT TO DIG CALL:
MILWAUKEE AREA: (414) 259-1181
TOLL FREE: (800) 242-8511
HEARING IMPAIRED (TDD) (800) 542-2289

UTILITIES NOTE:

THE LOCATIONS OF THE UNDERGROUND UTILITIES SHOWN ON THE PLAN HAVE BEEN OBTAINED BY FIELD CHECKS, A UTILITY LOCATE THROUGH DIGGER'S HOTLINE, AND SEARCHES OF AVAILABLE RECORDS. IT IS BELIEVED THAT THEY ARE ESSENTIALLY CORRECT, BUT THE SURVEYOR DOES NOT GUARANTEE THEIR ACCURACY OR COMPLETENESS. THE CONTRACTOR SHOULD VERIFY LOCATIONS W THE UTILITY COMPANIES AND THE " VILLAGE OF AVOCA " PRIOR TO STARTING ANY EXCAVATION.



PROJECT LOCATION MAP
SCALE: N.T.S.

GENERAL NOTES - TRAFFIC CONTROL

1. *THE SIGN LOCATIONS SHOWN ARE APPROXIMATE LOCATIONS. CONTRACTOR SHALL INSTALL TRAFFIC CONTROL SIGNS PER WISCONSIN DEPARTMENT OF TRANSPORTATION (DOT) STANDARDS AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).*
2. *THE SIGNS SHOWN ARE THE MINIMUM TRAFFIC CONTROL THAT WILL BE REQUIRED FOR THE PROJECT. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADDITIONAL TRAFFIC CONTROL MEASURES DURING CONSTRUCTION TO MEET THE STANDARDS OF THE WISCONSIN DOT AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, AND AS DIRECTED BY THE PROJECT ENGINEER.*

SHEET INDEX:

SHEET TITLE:	SHEET DESCRIPTION:	DATE OF ISSUE:	DATE OF REVISION:
G000	TITLE SHEET & PROJECT LOCATION MAP	AUG. 9, 2024	-
G001	LEGEND & GENERAL NOTES	AUG. 9, 2024	-
C101	PLAN & VIEW - MORREY CREEK REACH 2 & 3	AUG. 9, 2024	-
C102	PLAN & VIEW - MORREY CREEK REACH 1	AUG. 9, 2024	-
C201	DETAILS - EROSION CONTROL & NOTES	AUG. 9, 2024	-
C202	DETAILS - STREAMBANK	AUG. 9, 2024	-

PROJECT INFORMATION:

OWNER:
VILLAGE OF AVOCA
MS. RONEE HARRIS
VILLAGE PRESIDENT
401 WISCONSIN STREET
AVOCA, WI 53506
(608) 532-6831

STREET AND STORM SEWER:
VILLAGE OF AVOCA
MR. ADAM LINS
STREET SUPERINTENDENT
401 WISCONSIN STREET
AVOCA, WI 53506
(608) 532-6482

WATER AND SANITARY SEWER UTILITIES:
VILLAGE OF AVOCA
MR. ADAM LINS
DIRECTOR OF PUBLIC WORKS
401 WISCONSIN STREET
AVOCA, WI 53506
(608) 532-6482

TELEPHONE UTILITY:
CENTURYLINK
MR. KEVIN ZICKERT
130 4TH ST.
BARABOO, WI 53913
(262) 392-5200

CABLE TELEVISION UTILITY:
PACKERLAND BROADBAND
105 KENT STREET
IRON MOUNTIAN, MI 49801
(800) 236-8434

ELECTRICAL & NATURAL GAS UTILITIES:
ALLIANT ENERGY
MR. KAI GRAEF
900 PRAIRIE DRIVE
SPRING GREEN, WI 53588
(608) 459-5797

NATURAL GAS UTILITY:
WE ENERGIES
MR. ADAM MARING
W3025 19TH AVENUE
MONROE, WI 53566
(608)-328-5679 (OFFICE)
(608)-426-1715 (CELL)
WE ENERGIES
PAVING COORDINATOR
300 S. 116TH STREET
WEST ALLIS, WI 53214
(800) 242-9137

ENGINEER:
DELTA 3
EVERY ANGLE COVERED
PROFESSIONAL CIVIL, MUNICIPAL, & STRUCTURAL ENGINEERING
GRAND MATING+LAND DEVELOPMENT+PLANNING & GIS/ GPS SERVICES
825 SOUTH CHESTNUT STREET, PLATTEVILLE, WISCONSIN 53818 — PHONE: (608) 348-5355
898 JACKSON STREET, DUBUQUE, IOWA 52001 — PHONE: (563) 542-9005

FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:
MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

PROPOSED 2024 STREAM IMPROVEMENTS - MORREY CREEK

AVOCA, WISCONSIN

PROJECT LOCATION: MORREY CREEK
OWNER: VILLAGE OF AVOCA, 401 WISCONSIN STREET, AVOCA, WI 53506

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
	--/--/----	-.----

AGENCY REVIEW	
PROJECT NUMBER	D22-209
SHEET SCALE	NOT TO SCALE
DRAWN BY	C. COYIER
DATE ISSUED	AUG. 9, 2024
SHEET DESC.	TITLE SHEET & PROJECT LOCATION MAP

SHEET TITLE:

G000

SHEET NUMBER # **1 of 6**

LEGEND

EX. CON. MANHOLE
EX. ECC. MANHOLE
EX. LIFT STATION
EX. CLEAN OUT
EX. FIRE HYDRANT
EX. WATER SERVICE
EX. WATER VALVE
EX. YARD HYDRANT
EX. CATCH BASIN
EX. STORM INLET
EX. NATURAL GAS VALVE
EX. NATURAL GAS METER
EX. POWER POLE
EX. LIGHT POLE
EX. WARNING SIREN
EX. TEL. PEDESTAL
EX. MAILBOX
EX. LP TANK
EX. SATELLITE DISH
Ex. POST OR POLE
EX. STREET SIGN
EX. EVERGREEN TREE
EX. DECIDUOUS TREE
EX. TREE STUMP
EX. BUSH/SHRUB
EX. TREE/BRUSH LINE
EX. WINDMILL
EX. PARK BENCH
EX. BENCHMARK
SURVEY CONTROL POINT
EX. PROPERTY PIN
R/W — RIGHT-OF-WAY
P/L — PROPERTY LINE
EASEMENT
San. Lat. — EX. SAN. S. LATERAL
6" San. S. — EX. 6" SAN. S. MAIN
8" San. S. — EX. 8" SAN. S. MAIN
10" San. S. — EX. 10" SAN. S. MAIN
12" San. S. — EX. 12" SAN. S. MAIN
15" San. S. — EX. 15" SAN. S. MAIN
EX. FLOW DIRECTION
EX. CAPPED SERVICE
EX. WATER SERVICE
4" Water — EX. 4" WATER MAIN
6" Water — EX. 6" WATER MAIN
8" Water — EX. 8" WATER MAIN
10" Water — EX. 10" WATER MAIN
12" Water — EX. 12" WATER MAIN
EX. <12" STORM SEWER
12" St. Sewer — EX. 12" STORM SEWER
15" St. Sewer — EX. 15" STORM SEWER
18" St. Sewer — EX. 18" STORM SEWER
24" St. Sewer — EX. 24" STORM SEWER
27" St. Sewer — EX. 27" STORM SEWER
30" St. Sewer — EX. 30" STORM SEWER
36" St. Sewer — EX. 36" STORM SEWER
42" St. Sewer — EX. 42" STORM SEWER
48" St. Sewer — EX. 48" STORM SEWER
EX. CURB AND GUTTER
GAS — EX. U.GRD N. GAS UTILITY
UGE — EX. U.GRD ELECTRIC UTILITY
UGC — EX. U.GRD CABLE TV UTILITY
TEL — EX. U.GRD TELEPHONE UTILITY
FO — EX. U.GRD FIBER OPTIC UTILITY
OHE — EX. OVERHEAD ELECTRIC
EX. FENCE
EX. RAILROAD TRACKS
99 — EX. CONTOUR
EX. DRAINAGE SWALE

PROP. SANITARY SEWER LATERAL
PROP. <6" SANITARY SEWER MAIN
PROP. 6" SANITARY SEWER MAIN
PROP. 8" SANITARY SEWER MAIN
PROP. 10" SANITARY SEWER MAIN
PROP. 12" SANITARY SEWER MAIN
PROP. 15" SANITARY SEWER MAIN
PROP. 18" SANITARY SEWER MAIN
PROP. CIPP LINER
PROP. FLOW DIRECTION
PROP. WATER SERVICE
PROP. <4" WATER MAIN
PROP. 4" WATER MAIN
PROP. 6" WATER MAIN
PROP. 8" WATER MAIN
PROP. 10" WATER MAIN
PROP. 12" WATER MAIN
PROP. 15" WATER MAIN
PROP. <12" STORM SEWER
PROP. 12" STORM SEWER
PROP. 15" STORM SEWER
PROP. 18" STORM SEWER
PROP. 24" STORM SEWER
PROP. 30" STORM SEWER
PROP. 36" STORM SEWER
PROP. 48" STORM SEWER
PROP. CURB AND GUTTER
PROP. CURB BACK OPENING
GAS — PROP. U.GRD GAS UTILITY
UGE — PROP. U.GRD ELECTRIC UTILITY
UGCTV — PROP. U.GRD CABLE TV UTILITY
UGT — PROP. U.GRD TELEPHONE UTILITY
FIBER — PROP. U.GRD FIBER OPTIC UTILITY
OHE — PROP. OVERHEAD ELECTRIC
CAUTION NATURAL GAS — PROP. CROSSING OF N. GAS UTILITY
PROP. UTILITY POLE
PROP. LIGHT POLE
PROP. FENCE
TEMPORARY EASEMENT
CONSTRUCTION EASEMENT
ESTIMATED DISTURBANCE LIMITS
99 — PROP. CONTOUR
PROP. DRAINAGE SWALE
PROP. SILT FENCE
PROP. EROSION CONTROL SEDIMENT LOG
PROP. PAVEMENT MARKING
PAINTED TRAFFIC ARROW
ADA PARKING DESIGNATION
10 — PARKING STALL COUNT
5'R / 0+00 — RADIUS POINT/SIZE STA. ON CENTERLINE
PROP. HANDICAP RAMP WITH DETECTABLE WARNING FIELD
SOIL BORING LOCATION
RIVER FLOW DIRECTION
PROP. 4' DIA. SANITARY MANHOLE
PROP. 5' DIA. SANITARY MANHOLE
PROP. MANHOLE CHIMNEY REHABILITATION / TOP ADJUSTMENT
PROP. SANITARY LIFT STATION

PROP. TYPE "X" CURB & GUTTER
PROP. REVERSE-PITCH CURB & GUTTER
PROP. HOT MIX ASPHALT PAVEMENT (DRIVEWAY)
PROP. 4" CONCRETE SIDEWALK
PROP. 6" CONCRETE PAVEMENT
PROP. 8" CONCRETE PAVEMENT
PROP. GRAVEL SHOULDER / DRIVEWAY
EROSION MATTING (MILD SLOPES)
EROSION MATTING (STEEP SLOPES)
PROP. STREAM BANK GRADING (6:1 SLOPES)
PROP. STREAM BANK GRADING W/RIP-RAP (2:1 SLOPES)
PROP. BACKWATER REFUGE
PROP. STORM STRUCTURES - PROFILE
PROP. STORM PIPE(RCP) - PROFILE
PROP. STORM PIPE(CMP OR HDPE) - PROFILE
PROP. SANITARY STRUCTURE - PROFILE
PROP. WATER MAIN PIPE - PROFILE
PROP. CLAY LINER - PROFILE
PROP. SANITARY SEWER FORCE MAIN - PROFILE
PROP. SPOT REPAIR - PROFILE / PLAN VIEW
PROP. CASING PIPE - PROFILE
PROP. CLEARING AND GRUBBING
PROP. BUILDING REMOVAL
PROP. SIDEWALK REMOVAL

PROP. PRESSURE-REDUCING VALVE STATION
PROP. FIRE HYDRANT
PROP. WATER SERVICE
PROP. WATER SERVICE WITH VALVE BOX SLEEVE
PROP. WATER VALVE
PROP. WATER BEND - HORIZONTAL
PROP. WATER BEND - VERTICAL
PROP. WATER BEND <5°
PROP. WATER TEE
PROP. WATER CROSS
PROP. WATER REDUCER
PROP. MJ PLUG
PROP. 4' DIA. STORM MANHOLE
PROP. 5' DIA. STORM MANHOLE
PROP. INLET
PROP. 4' DIA. INLET
PROP. 6' DIA. INLET
PROP. 4' DIA. CATCH BASIN- W/ 2'X3' CASTING
PROP. 5' DIA. CATCH BASIN- W/ 2'X3' CASTING
PROP. 6' DIA. CATCH BASIN- W/ 2'X3' CASTING
PROP. 4'X6' CATCH BASIN W/2'X3' CASTING
PROP. CURB OPENING CASTING
PROP. 2'X3' CATCH BASIN
PROP. ADJUSTED CATCH BASIN TOP
PROP. WISDOT TYPE 8 INLET
PROP. WISDOT TYPE 9 INLET
PROP. CMP ENDWALL
PROP. RCP ENDWALL

KEY NOTES [100] :

100 PROPOSED SILT FENCE FOR EROSION CONTROL.
101 PROPOSED SEDIMENT LOG FOR EROSION CONTROL.
102 PROPOSED TRACKING PAD FOR EROSION CONTROL.
103 RE-GRADE YARD/DITCH LINE (MIN. SLOPE 1.0%).
104 PROPOSED EROSION MAT CLASS I, TYPE 'B'.
105 INSTALL TYPE 'D' INLET PROTECTION.
106 PROPOSED MAIL BOX RELOCATION.
107 ITEM TO REMAIN.
108 CONTRACTOR TO REMOVE ITEM.
109 PROPOSED TURBIDITY BARRIER (TYP.) (SEE DETAIL - SHEET C203).
110 PROPOSED EROSION CONTROL REVEGETATIVE MAT (ECRM).
111 REMOVE AND SALVAGE TO OWNER IN PRE-CONSTRUCTION CONDITION.
112 REINSTALL STREET SIGN AS PER OWNER/WISDOT REQUIREMENTS.
113 PROPOSED STREAM BANK GRADING (2:1 SLOPE) WITH RIP-RAP TO TOP OF BANK (SEE DETAIL - SHEET C202).
114 PROPOSED STREAM BANK GRADING (6:1 SLOPE)(SEE DETAIL - SHEET C202).
115 PROPOSED BED LOG IN STREAM HABITAT STRUCTURE (SEE DETAIL - SHEET C202).
200 PROPOSED SANITARY SEWER [SIZE].
201 NEW SANITARY SEWER LATERAL [SIZE].
202 REPLACE EXISTING SANITARY SEWER LATERAL.
203 RECONNECT EXISTING SANITARY SEWER LATERAL.
204 CONNECTION TO EXISTING SANITARY SEWER PIPE/STRUCTURE.
205 REMOVE EXISTING SANITARY SEWER PIPE /STRUCTURE.
206 REHABILITATE SANITARY MANHOLE; SEE TABLE 'B'.
207 SANITARY SEWER SPOT REPAIR.
208 ABANDON AND CAP EXISTING SANITARY SEWER.
209 ABANDON EXISTING SANITARY SEWER LATERAL.
210 CONTRACTOR TO FIELD VERIFY SANITARY SEWER LATERAL LOCATION/ACTIVITY AND REPLACE ACCORDING TO ENGINEER.
300 PROPOSED WATER MAIN [SIZE].
301 NEW WATER SERVICE [SIZE].
302 REPLACE EXISTING WATER SERVICE WITH 1" WATER SERVICE.
303 RECONNECT EXISTING WATER SERVICE.
304 DIRECTIONAL DRILL PROPOSED WATER SERVICE.
305 CONNECTION TO EXISTING WATER MAIN.
306 EXISTING HYDRANT TO BE REMOVED AND SALVAGED TO OWNER.
307 REMOVE EXISTING WATER MAIN VALVE BOX/STRUCTURE.
308 ADJUST EXISTING WATER MAIN VALVE BOX.
309 ABANDON, DRAIN, & CAP EXISTING WATER MAIN.
310 ABANDON EXISTING WATER SERVICE.
311 CONTRACTOR TO FIELD VERIFY WATER SERVICE LOCATION/ACTIVITY AND REPLACE ACCORDING TO ENGINEER.
400 PROPOSED STORM SEWER [SIZE].
401 CONNECT EXISTING ROOF DRAIN TO CURB OPENING
402 CONNECTION TO EXISTING STORM SEWER PIPE/STRUCTURE.
403 REMOVE EXISTING STORM SEWER PIPE/STRUCTURE.
404 ABANDON & CAP EXISTING STORM SEWER.
405 ADJUST EXISTING STORM STRUCTURE.
500 TREE & STUMP TO BE REMOVED (LESS THEN 12")
501 TREE & STUMP TO BE REMOVED (12" & GREATER)
502 SHRUB TO BE REMOVED.
503 CLEAR AND GRUB BRUSH LINE AS NECESSARY TO COMPLETE CONSTRUCTION. ALL CLEARING TO BE VERIFIED BY PROJECT ENGINEER.
504 REMOVE AND REINSTALL/REPLACE EXISTING LANDSCAPING, FENCE, RETAINING WALL, ETC. (IF NECESSARY).
505 REMOVE EXISTING LANDSCAPING, FENCE, RETAINING WALL, ETC.
506 POLE/PEDESTAL TO BE SECURED BY UTILITY COMPANY DURING CONSTRUCTION.
507 POLE TO BE RELOCATED BY UTILITY COMPANY.
508 GUY WIRE TO BE RELOCATED BY UTILITY COMPANY.
509 PEDESTAL TO BE RELOCATED BY UTILITY COMPANY.
510 UTILITY CONFLICT - TO BE RELOCATED/ADJUSTED BY UTILITY COMPANY.
511 POTENTIAL UTILITY CONFLICT - VERIFY WITH UTILITY COMPANY.
512 **CAUTION!** - UTILITY CROSSING.
600 REMOVE EXISTING CURB & GUTTER.
601 PROPOSED 24" CONCRETE CURB & GUTTER.
602 PROPOSED 30" CONCRETE CURB & GUTTER.
603 PROPOSED 36" CONCRETE CURB & GUTTER.
604 MATCH TO EXISTING CURB & GUTTER.
605 PROVIDE TYPE 'X' CURB.
606 PROVIDE REVERSE-PITCH CURB & GUTTER.
607 PROVIDE CURB TAPER.
608 REMOVE ASPHALT/CONCRETE/WALL/STEPS.
609 PROPOSED 4" CONCRETE SIDEWALK.
610 PROPOSED 6" CONCRETE SIDEWALK/DRIVEWAY.
611 PROPOSED 6" CONCRETE PAVEMENT.
612 PROPOSED 8" CONCRETE PAVEMENT.
613 PROPOSED CONCRETE STEPS. STEP RISE HEIGHT AND STEP TREAD DEPTH SHALL MEET APPLICABLE BUILDING CODES. CONTRACTOR SHALL CONFIRM REQUIRED NUMBER OF STEPS WITH PROJECT ENGINEER PRIOR TO INSTALL.
614 PROPOSED 2' GRAVEL SHOULDER.
615 REGRADE EXISTING GRAVEL.
616 PROPOSED GRAVEL DRIVEWAY.
617 REMOVE & REPLACE GRAVEL DRIVEWAY.
618 REMOVE GRAVEL DRIVEWAY & REPLACE WITH BITUMINOUS DRIVEWAY/APRON.
619 REMOVE & REPLACE HMA PAVEMENT.
620 REMOVE & REPLACE HMA PAVEMENT DRIVEWAY.
621 PROPOSED HMA PAVEMENT.
622 MATCH TO EXISTING EDGE PAVEMENT.
623 PROPOSED RESIDENTIAL HMA PAVEMENT DRIVEWAY.
624 PROPOSED COMMERCIAL HMA PAVEMENT DRIVEWAY.
625 REMOVE & REPLACE 4" CONCRETE SIDEWALK.
626 REMOVE & REPLACE 6" CONCRETE SIDEWALK/DRIVEWAY.
627 PROPOSED HANDICAP RAMP WITH - D. WARN. FIELD [S.F].
628 SAW CUT PCC PAVEMENT.
629 SAW CUT HMA PAVEMENT.
630 PROPOSED BITUMINOUS WEDGE CURB.

NOTES:

TRAFFIC CONTROL NOTE:
ALL CONTRACTORS MUST CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND THE REQUIREMENTS OF THE WISCONSIN DEPARTMENT OF TRANSPORTATION. ONE LANE OF TRAFFIC MUST REMAIN OPEN DURING AND AFTER ALL CONSTRUCTION ACTIVITIES FOR EMERGENCY VEHICLE ACCESS.

STREET SIGN NOTE:
CONTRACTOR WILL BE RESPONSIBLE FOR REMOVING, STORING, AND RESETTING ALL PERMANENT SIGNS. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL EXISTING SIGNS UNTIL REMOVED. CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL TEMPORARY SIGNS THAT MAY BE REQUIRED.

TRAFFIC SIGN NOTE:
CONTRACTOR TO PROVIDE TEMPORARY TRAFFIC SIGNS FOR ANY TRAFFIC SIGNS DISTURBED DURING CONSTRUCTION. ALL DISTURBED TRAFFIC SIGNS MUST BE REPLACED AND INSTALLED AS PER LOCAL REGULATIONS AT THE COMPLETION OF THE PROJECT.

EROSION CONTROL NOTE:
CONTRACTOR TO INSTALL BACKFILL MATERIAL INTO THE EXCAVATED TRENCH AS SOON AS POSSIBLE TO IMPLEMENT EROSION CONTROL.

PROPERTY LINE AND RIGHT-OF-WAY NOTE:
ALL RIGHT-OF-WAYS AND PROPERTY LINES SHOWN ARE APPROXIMATE AND FOR ILLUSTRATIVE PURPOSES ONLY. A PROPERTY SURVEY PERFORMED BY A PROFESSIONAL LAND SURVEYOR SHOULD BE COMPLETED TO DETERMINE THE ACTUAL PROPERTY LINE AND RIGHT-OF-WAY LOCATIONS.

MAILBOX RELOCATION NOTE:
CONTRACTOR TO RELOCATE EXISTING MAILBOXES DURING CONSTRUCTION (COORDINATE AND VERIFY WITH LOCAL POSTAL SERVICE ON LOCATION). RESET BEHIND CURB AND GUTTER OR SHOULDER ACCORDING TO THE REQUIREMENTS OF THE LOCAL POSTMASTER UPON COMPLETION OF STREET CONSTRUCTION.

TREE TRIMMING NOTE:
CONTRACTOR TO PROPERLY TRIM ALL TREE BRANCHES, ROOTS, AND BUSHES DISTURBED DUE TO CONSTRUCTION.

TREE REMOVAL NOTE:
CONTRACTOR TO CONTACT ENGINEER OR ***VILLAGE OF AVOCA*** FOR VERIFICATION PRIOR TO ANY TREE REMOVAL.

SAW CUT NOTE:
CONTRACTOR TO PROVIDE FULL DEPTH SAW CUTS AND REPLACE PAVEMENT.

UTILITIES' NOTE:
THE LOCATIONS OF THE UNDERGROUND UTILITIES SHOWN ON THE PLAN HAVE BEEN OBTAINED BY FIELD CHECKS, A UTILITY LOCATE THROUGH DIGGER'S HOTLINE , AND SEARCHES OF AVAILABLE RECORDS. IT IS BELIEVED THAT THEY ARE ESSENTIALLY CORRECT, BUT THE SURVEYOR DOES NOT GUARANTEE THEIR ACCURACY OR COMPLETENESS. THE CONTRACTOR SHOULD VERIFY LOCATIONS W/ THE UTILITY COMPANIES AND ***VILLAGE OF AVOCA*** PRIOR TO STARTING ANY EXCAVATION.

SITE RESTORATION NOTE:
CONTRACTOR WILL BE RESPONSIBLE FOR REPLACEMENT OF ALL DISTURBED PROJECT AREA COMPONENTS INCLUDING, BUT NOT LIMITED TO, EXISTING CONCRETE, BITUMINOUS PAVEMENT, GRAVEL, CULVERTS, WATER AND SANITARY SEWER SYSTEM COMPONENTS, STORM SEWER SYSTEM COMPONENTS, TREES, LAWN ORNAMENTS, FENCING, YARD LANDSCAPING, RETAINING WALLS, MAILBOXES, AND LANDSCAPE AREAS.

PROPERTY DAMAGES:
THE CONTRACTOR IS RESPONSIBLE FOR THE PRESERVATION OF ADJACENT PROPERTY AND FOR ANY DAMAGE TO THE SITE OR TO ADJACENT PROPERTY INCIDENTAL TO THE CONSTRUCTION ACTIVITIES. AFTER THE COMPLETION OF CONSTRUCTION, ANY AREAS ADJACENT TO THE CONSTRUCTION SITE DAMAGED BY THE CONTRACTOR DURING EXECUTION OF THE CONTRACT SHALL BE RESTORED TO MATCH THE PRECONSTRUCTION CONDITIONS.

100-YEAR REGIONAL FLOOD ELEVATION = 698.00' (USGS)

DISCIPLINE	DESIGNATION
REMOVAL	R
GENERAL	G
CIVIL	C
LANDSCAPE	L
AQUATIC	AQ
ARCHITECTURAL	A
STRUCTURAL	S
ELECTRICAL	E
INSTRUMENTATION/CONTROLS	N
PROCESS	D
PLUMBING	P
HVAC /MECHANICAL	M

DISCIPLINE DESIGNATORS

TYPE	DESIGNATION
NOTES & SCHEDULES	0
PLANS	1
ELEVATIONS & DETAILS	2
CROSS-SECTIONS	3
DIAGRAMS	4

DRAWING SHEET DESIGNATION

C102
DRAWING NUMBER
DRAWING SHEET DESIGNATION
DISCIPLINE DESIGNATION (MAY HAVE MULTIPLE)

SHEET NUMBER IDENTIFICATION

ENGINEER:
DELTA 3
EVERY ANGLE COVERED
PROFESSIONAL CIVIL, MUNICIPAL, & STRUCTURAL ENGINEERING
GRAND MARKING • LAND DEVELOPMENT • PLANNING & CADD SERVICES
825 SOUTH CHESTNUT STREET PHONE: (608) 348-5355
PLATTEVILLE, WISCONSIN 53818
898 JACKSON STREET PHONE: (563) 542-9005
DUBUQUE, IOWA 52001
FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:
MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

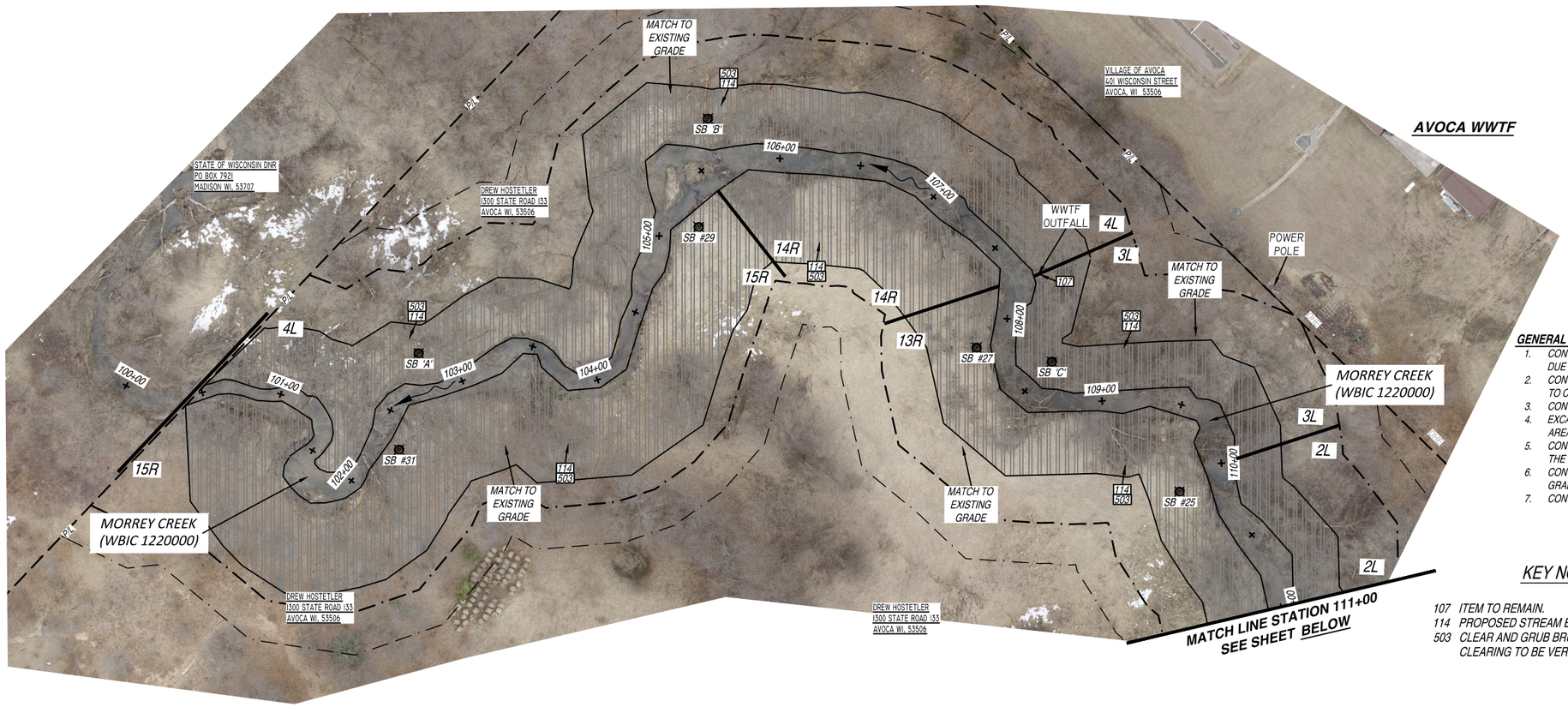
PROPOSED 2024 STREAM IMPROVEMENTS - MORREY CREEK
AVOCA, WISCONSIN
PROJECT LOCATION: MORREY CREEK
OWNER: VILLAGE OF AVOCA; 401 WISCONSIN STREET, AVOCA, WI 53506

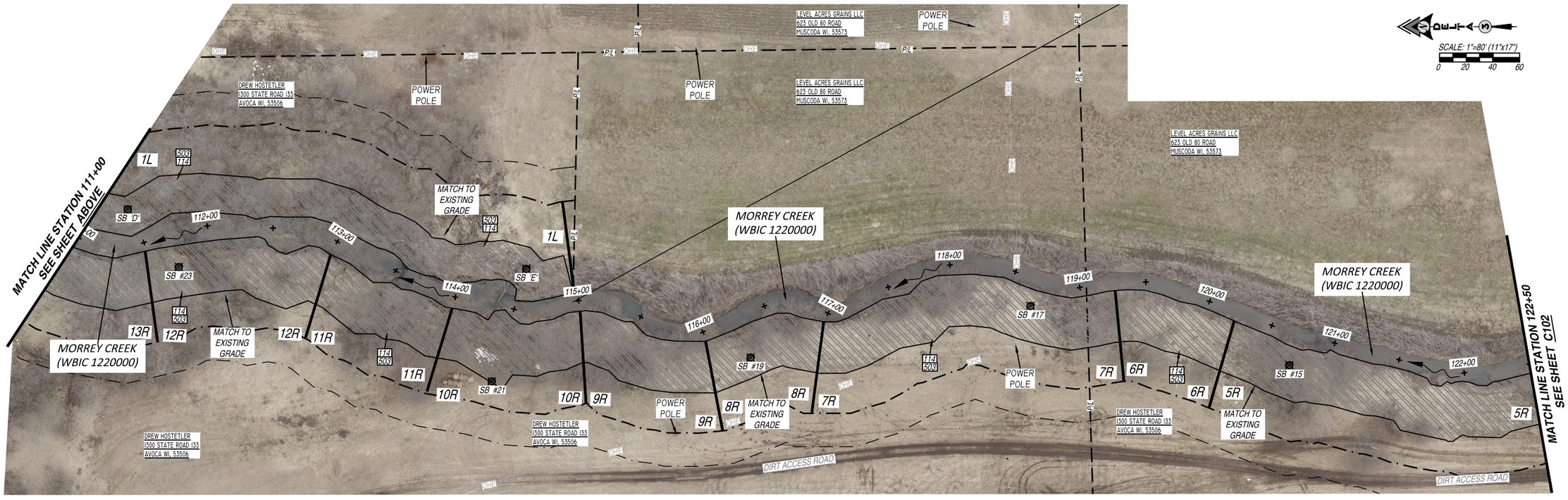
REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
-/-/----		-.-----

AGENCY REVIEW	
PROJECT NUMBER	D22-209
SHEET SCALE	NOT TO SCALE
DRAWN BY	C. COYIER
DATE ISSUED	AUG. 9, 2024
SHEET DESC.	LEGEND & GENERAL NOTES

SHEET TITLE:
G001

SHEET NUMBER # 2 of 6





SCALE: 1"=80' (11"x17")
0 20 40 60

GENERAL NOTES:

1. CONTRACTOR SHALL REPAIR ALL DRIVEWAYS AND ACCESS ROADS DAMAGED DUE TO CONSTRUCTION ACTIVITIES.
2. CONTRACTOR TO INSTALL EROSION CONTROL AND TURBIDITY BARRIER PRIOR TO COMMENCING CONSTRUCTION.
3. CONTRACTOR TO CLEAR AND GRUB ALL PROPOSED GRADING LOCATIONS.
4. EXCAVATED MATERIAL SHALL NOT BE DEPOSITED WITHIN THE FLOODPLAIN AREA OR WETLANDS .
5. CONTRACTOR SHALL NOT REMOVE TREES, SOIL, ROCK, AND THE LIKE FROM THE SITE WITHOUT CONSENT OF THE OWNER.
6. CONTRACTOR TO INSTALL EXISTING DRAIN TILES THROUGH PROPOSED GRADING AND RIP-RAP.
7. CONTRACTOR TO RESTORE/LANDSCAPE ALL DISTURBED AREAS.

KEY NOTES [100] :

107 ITEM TO REMAIN.
114 PROPOSED STREAM BANK GRADING (6:1 SLOPE); SEE DETAIL - SHEET C202.
503 CLEAR AND GRUB BRUSH LINE AS NECESSARY TO COMPLETE CONSTRUCTION. ALL CLEARING TO BE VERIFIED BY PROJECT ENGINEER.

ENGINEER:
DELTA 3
EVERY ANGLE COVERED
PROFESSIONAL CIVIL, MUNICIPAL, & STRUCTURAL ENGINEERING
GRANT WRITING • LAND DEVELOPMENT • PLANNING & GIS/D SERVICES
825 SOUTH CHESTNUT STREET PHONE: (608) 348-5355
PLATTEVILLE, WISCONSIN 53818
898 JACKSON STREET PHONE: (563) 542-9005
DUBUQUE, IOWA 52001

FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:
MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

PROPOSED 2024 STREAM IMPROVEMENTS - MORREY CREEK

AVOCA, WISCONSIN

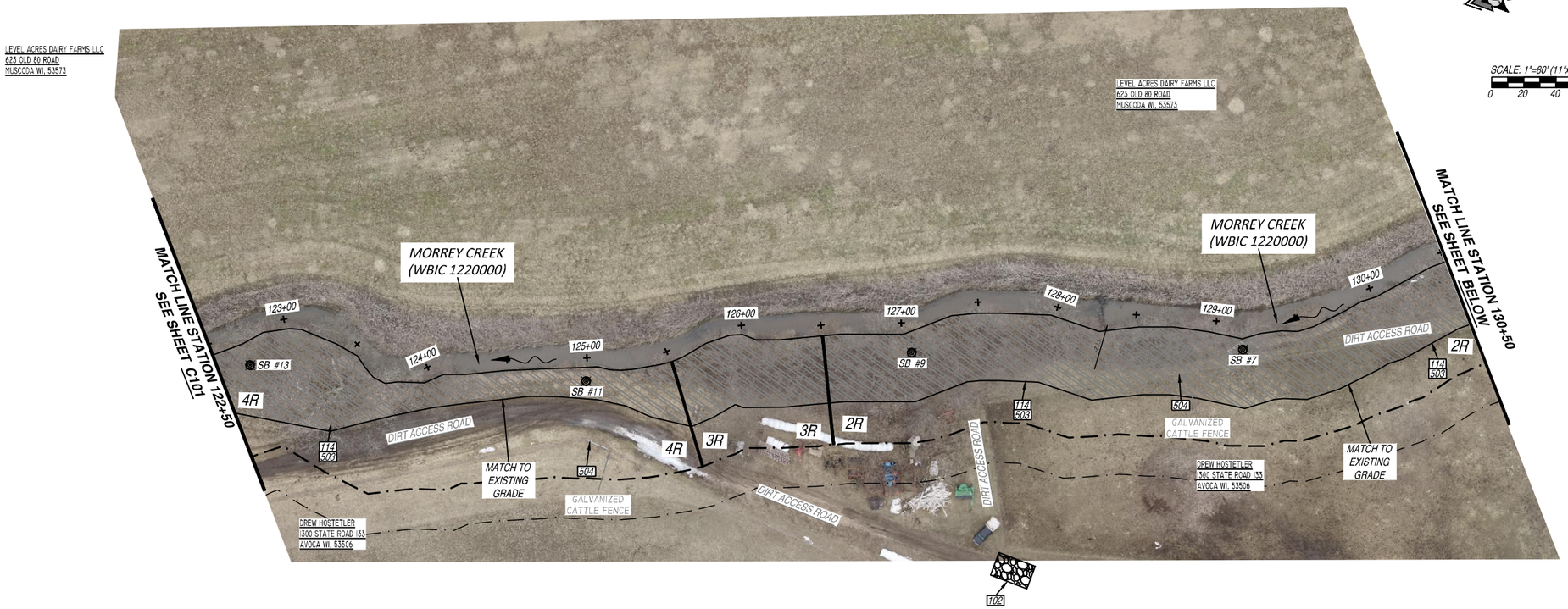
PROJECT LOCATION: MORREY CREEK
OWNER: VILLAGE OF AVOCA; 401 WISCONSIN STREET, AVOCA, WI 53506

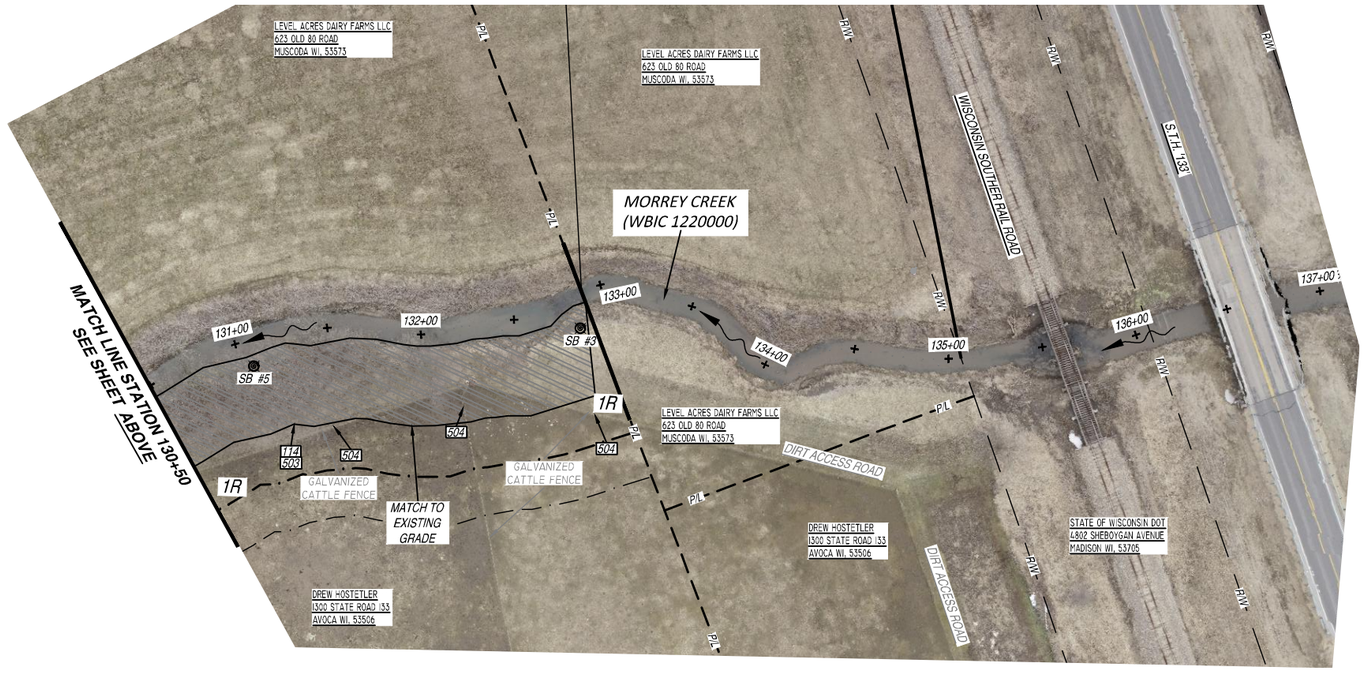
REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
--/--/----		-.-----

AGENCY REVIEW	
PROJECT NUMBER	D22-209
SHEET SCALE	SEE BAR SCALE
DRAWN BY	C.COYIER
DATE ISSUED	AUG. 9, 2024
SHEET DESC.	PLAN VIEW - REACH 2 & 3

SHEET TITLE:
C101

SHEET NUMBER # 3 of 6





SCALE: 1"=80' (11"x17")
0 20 40 60

KEY NOTES [100] :

102 PROPOSED TRACKING PAD FOR EROSION CONTROL.
114 PROPOSED STREAM BANK GRADING (6:1 SLOPE); SEE DETAIL - SHEET C202.
503 CLEAR AND GRUB BRUSH LINE AS NECESSARY TO COMPLETE CONSTRUCTION. ALL CLEARING TO BE VERIFIED BY PROJECT ENGINEER.
504 REMOVE AND REINSTALL/REPLACE EXISTING LANDSCAPING, FENCE, RETAINING WALL, ETC. (IF NECESSARY).

GENERAL NOTES:

1. CONTRACTOR SHALL REPAIR ALL DRIVEWAYS AND ACCESS ROADS DAMAGED DUE TO CONSTRUCTION ACTIVITIES.
2. CONTRACTOR TO INSTALL EROSION CONTROL AND TURBIDITY BARRIER PRIOR TO COMMENCING CONSTRUCTION.
3. CONTRACTOR TO CLEAR AND GRUB ALL PROPOSED GRADING LOCATIONS.
4. EXCAVATED MATERIAL SHALL NOT BE DEPOSITED WITHIN THE FLOODPLAIN AREA OR WETLANDS .
5. CONTRACTOR SHALL NOT REMOVE TREES, SOIL, ROCK, AND THE LIKE FROM THE SITE WITHOUT CONSENT OF THE OWNER.
6. CONTRACTOR TO INSTALL EXISTING DRAIN TILES THROUGH PROPOSED GRADING AND RIP-RAP.
7. CONTRACTOR TO RESTORE/LANDSCAPE ALL DISTURBED AREAS.

ENGINEER:
DELTA 3
EVERY ANGLE COVERED
PROFESSIONAL CIVIL, MANGRAL, & STRUCTURAL ENGINEERING
GRAIN SYSTEMS • LAND DEVELOPMENT • PLANNING & CADD SERVICES
825 SOUTH CHESTNUT STREET PHONE: (608) 348-5355
PLATTEVILLE, WISCONSIN 53818
898 JACKSON STREET PHONE: (563) 542-9035
DUBUQUE, IOWA 52001

FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:
MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

PROPOSED 2024 STREAM IMPROVEMENTS - MORREY CREEK

AVOCA, WISCONSIN

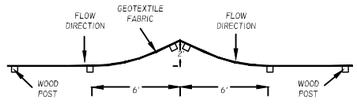
PROJECT LOCATION: MORREY CREEK
OWNER: VILLAGE OF AVOCA; 401 WISCONSIN STREET, AVOCA, WI 53506

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
--/--/----		-.-----

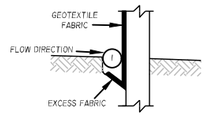
AGENCY REVIEW	
PROJECT NUMBER	D22-209
SHEET SCALE	SEE BAR SCALE
DRAWN BY	C. COYIER
DATE ISSUED	AUG. 9, 2024
SHEET DESC.	PLAN VIEW - REACH 1

SHEET TITLE:
C102

SHEET NUMBER # 4 of 6



SILT FENCE - JOINING TWO LENGTHS DETAIL
SCALE: N.T.S.

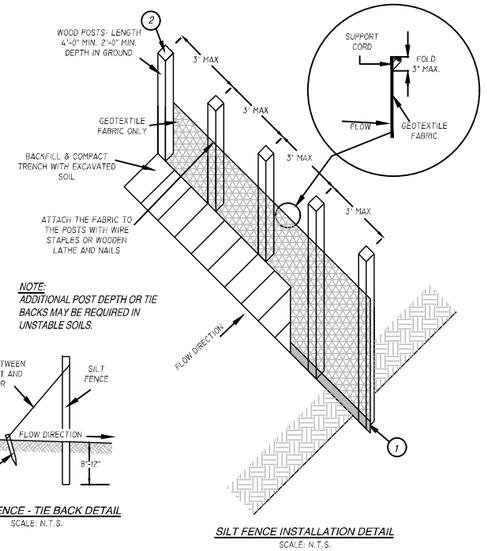


SILT FENCE - TRENCH DETAIL
SCALE: N.T.S.

GENERAL NOTES- SILT FENCE:

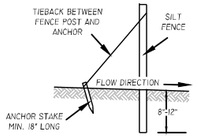
DETAILS OF CONSTRUCTION NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE WISDOT STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION (MOST CURRENT EDITION) AND THE APPLICABLE SPECIAL PROVISIONS.

1. TRENCH SHALL BE A MINIMUM OF 4" WIDE & 6" DEEP TO BURY AND ANCHOR THE GEOTEXTILE FABRIC. FOLD MATERIAL TO FIT TRENCH AND BACKFILL & COMPACT TRENCH WITH EXCAVATED SOIL.
2. WOOD POST SHALL BE A MINIMUM SIZE OF 1-1/8" X 1-1/8" OF OAK OR HICKORY.



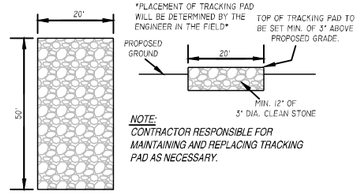
SILT FENCE INSTALLATION DETAIL
SCALE: N.T.S.

NOTE:
ADDITIONAL POST DEPTH OR TIE BACKS MAY BE REQUIRED IN UNSTABLE SOILS.



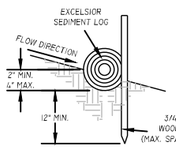
SILT FENCE - TIE BACK DETAIL
SCALE: N.T.S.

SILT FENCE DETAILS
SCALE: N.T.S.

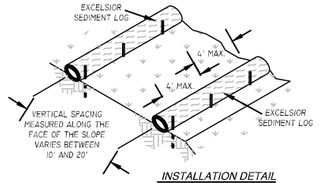


NOTE:
CONTRACTOR RESPONSIBLE FOR MAINTAINING AND REPLACING TRACKING PAD AS NECESSARY.

TRACKING PAD DETAIL
SCALE: N.T.S.



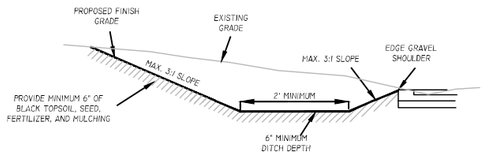
TRENCH DETAIL
SCALE: N.T.S.



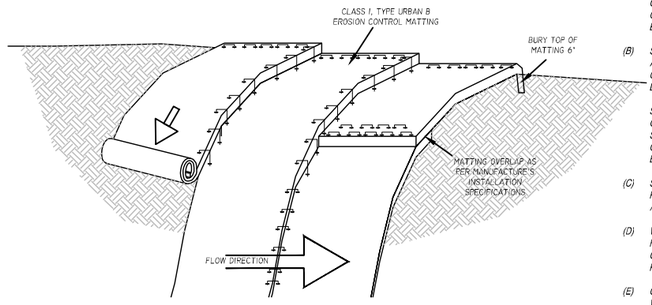
INSTALLATION DETAIL
SCALE: N.T.S.

TYPE 1 = 20" ROLL (HEAVY DUTY CONCENTRATED FLOW)
TYPE 2 = 12" ROLL (HEAVY CONCENTRATED FLOW)
TYPE 3 = 9" ROLL (MILD CONCENTRATED FLOW)
TYPE 4 = 8" ROLL (LOW CONCENTRATED FLOW)

EROSION CONTROL SEDIMENT LOG
SCALE: N.T.S.



REGRADED DITCH DETAIL
SCALE: N.T.S.



EROSION MATTING NOTES:

1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING APPLICATION OF FERTILIZER AND MULCH AND SEED.
2. BEGIN AT THE TOP OF THE SHOULDER (OR CHANNEL) BY ANCHORING THE BLANKET IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
3. ROLL THE BLANKETS DOWN (STARTING AT DOWNSTREAM PROCEEDING UPSTREAM) HORIZONTALLY ACROSS THE SLOPE.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH MANUFACTURE'S RECOMENDED OVERLAP.
5. WHEN BLANKETS MUST BE SPLICED DOWN THE SLOPE, PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH AN OVERLAP. USE A DOUBLE ROW OF STAGGERED STAPLES 4" APART TO SECURE BLANKETS.
6. IN HIGH CHANNEL APPLICATIONS, A STAPLE SLOT IS RECOMMENDED AT 30 TO 40 FOOT INTERVALS. USE A ROW OF STAPLES 4" APART OVER THE ENTIRE WIDTH OF THE CHANNEL. PLACE A SECOND ROW 4" BELOW THE FIRST ROW IN A STAGERED PATTERN.
7. THE TERMINAL END OF THE BLANKETS MUST BE ANCHORED IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.

EROSION MATTING - SLOPE INSTALLATION DETAIL
SCALE: N.T.S.

EROSION CONTROL NOTES:

1. GENERAL EROSION NOTES AND MAINTENANCE MEASURES ARE ILLUSTRATED ON THE PLAN SHEETS. AFTER AWARD OF THE CONTRACT, THE GENERAL CONTRACTOR SHALL INSTALL ALL BEST MANAGEMENT PRACTICES AS SHOWN ON THE PLAN SHEETS. ONCE INSTALLED, THE GENERAL CONTRACTOR SHALL CONTACT DELTA 3 ENGINEERING, INC. (608-348-5355). ONCE NOTIFIED DELTA 3 ENGINEERING INC. WILL VISIT THE SITE WITHIN 5 DAYS TO REVIEW THE SITE WITH THE GENERAL CONTRACTORS SUPERINTENDENT. UPON VISITING THE SITE, THE CONSULTING ENGINEER AND THE GENERAL CONTRACTORS SUPERINTENDENT WILL REVIEW THE SITE FOR COMPLIANCE WITH THE EROSION CONTROL MEASURES. IF AND WHEN ALL BEST MANAGEMENT PRACTICES REQUIRED TO COMMENCE SITE CONSTRUCTION ARE IN PLACE, THE CONSULTING ENGINEER AND PROJECT SUPERINTENDENT WILL SIGN AND CERTIFY THIS FACT. THIS REVIEW AND CERTIFICATION SHALL TAKE PLACE PRIOR TO THE REQUIRED PRE-CONSTRUCTION MEETING. THE SITE SUPERINTENDENT SHALL MAINTAIN AN AS-BUILT COPY OF THE EROSION CONTROL MEASURES ON SITE AT ALL TIMES. ANY ACTIVITIES INVOLVING INSTALLATION OF BEST MANAGEMENT PRACTICES SHALL BE INDICATED ON THE AS-BUILT PLAN WITH AN INSTALLED TIME AND DATE. RECORDED INFORMATION SHALL BE PERMANENTLY PLACED ON THE SITE MAP INCLUDING ANY CHANGES MADE TO THE BEST MANAGEMENT PRACTICES. IF THE SITE MAP BECOMES HARD TO READ, THE INITIAL DRAWING SHALL BE SAVED AND A CLEAN COPY SHALL BE ISSUED IN ORDER TO CONTINUE RECORDING ANY ON-SITE EROSION CONTROL ACTIVITY.
2. A COMPLETE COPY OF ALL INSPECTION REPORTS, PLAN REVISIONS, ETC., MUST BE RETAINED AT THE PROJECT SITE AT ALL TIMES DURING DURATION OF THE PROJECT AND KEPT IN THE PERMANENT PROJECT RECORDS FOR AT LEAST FIVE YEARS FOLLOWING SUBMISSION OF THE NOTICE OF TERMINATION (NOT).
3. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INSURING THAT ALL SUB-CONTRACTORS INVOLVED IN GROUND DISTURBING ACTIVITY COMPLY WITH THE EROSION CONTROL REQUIREMENTS.
4. DAILY INSPECTIONS BY THE PROJECT SUPERINTENDENT AND MONTHLY INSPECTIONS BY THE OWNER'S CONSTRUCTION MANAGER MUST BE MADE TO DETERMINE THE EFFECTIVENESS OF THE EROSION CONTROL MEASURES. THE GENERAL CONTRACTOR IS TO INSPECT EROSION AND SEDIMENT CONTROLS WITHIN 24 HOURS AFTER A RAINFALL EVENT OF 0.5 INCHES OR GREATER. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR OR REPLACE EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES AS NECESSARY WITHIN 24 HOURS OF INSPECTION.
5. ONCE THE SITE REACHES FINAL STABILIZATION, ALL PERMANENT EROSION AND SEDIMENTATION CONTROLS ARE INSTALLED AND ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS ARE REMOVED, THE GENERAL CONTRACTOR AND OWNER MUST COMPLETE A FINAL SITE INSPECTION. UPON APPROVAL BY OWNER, THE OWNER AND GENERAL CONTRACTOR, AS APPLICABLE, MUST COMPLETE AND SUBMIT A NOTICE OF TERMINATION (NOT) FORM TO BE SUBMITTED TO THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES.
6. A RECORD OF THE DATES WHEN MAJOR GROUND-DISTURBING ACTIVITIES OCCUR, WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE, AND WHEN STABILIZATION MEASURES ARE INITIATED MUST BE MAINTAINED UNTIL THE NOT IS FILED. CONTROLS MUST BE IN PLACE DOWN GRADIENT OF GROUND-DISTURBING ACTIVITIES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
7. A LOG OF ALL INSPECTIONS BY FEDERAL, STATE, OR LOCAL STORM WATER OR OTHER ENVIRONMENTAL AGENCIES SHALL BE KEPT BY THE GENERAL CONTRACTOR. THE LOG SHALL INCLUDE THE DATE AND TIME OF VISIT AND WHETHER A REPORT WAS ISSUED OR WILL BE ISSUED AS A RESULT OF THE INSPECTION. ANY REPORTS ISSUED SHALL BE FAXED TO THE DELTA 3 ENGINEERING INC. 608-348-5455 (FAX).
8. SOIL STABILIZATION - THE PURPOSE OF SOIL STABILIZATION IS TO PREVENT SOIL FROM LEAVING THE SITE. IN THE NATURAL CONDITION, SOIL IS STABILIZED BY NATIVE VEGETATION. THE PRIMARY TECHNIQUE TO BE USED AT THIS PROJECT FOR STABILIZING SITE SOIL WILL BE TO PROVIDE A PROTECTIVE COVER OF TURF GRASS OR PAVEMENT.

   (A) TEMPORARY SEEDING OR STABILIZATION - AREAS MAY BE STABILIZED TEMPORARILY WITH THE USE OF FAST-GERMINATING ANNUAL SEED, STRAW MULCH, WOOD CELLULOSE FIBERS, TACKIFIERS, NETTING OR BLANKET. WHERE CONDITIONS ARE FAVORABLE, AREAS SHALL BE TEMPORARILY STABILIZED WITHIN 7 DAYS AFTER CONSTRUCTION ACTIVITY CEASES. ALL DISTURBED GROUND WHERE THERE WILL NOT BE CONSTRUCTION FOR LONGER THAN 14 DAYS MUST BE SEEDED OR OTHERWISE STABILIZED.

   (B) PERMANENT SEEDING OR SOD - ALL AREAS AT FINAL GRADE MUST BE SEEDED OR SODDED WITHIN 3 DAYS AFTER COMPLETION OF THE MAJOR CONSTRUCTION ACTIVITY. EXCEPT FOR SMALL LEVEL SPOTS, SEEDED AREAS SHOULD GENERALLY BE PROTECTED WITH MULCH. ALL AREAS TO BE SEEDED WILL ALSO HAVE TOPSOIL AND OTHER AMENDMENTS AS STATED IN WISDOT SPECIFICATION SECTION 02900-PLANTING.

   (C) MULCHING - ALL AREAS THAT ARE TEMPORARY OR PERMANENT SEEDED SHALL BE MULCHED ACCORDING TO SECTION 627 - MULCHING OF THE WISDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION. ALL MULCH IS TO BE ANCHORED UTILIZING METHOD A, B, OR C.

   (D) EROSION CONTROL MATTING - FOR ANY SLOPES GREATER THAN 3:1, EROSION MATTING IS REQUIRED.
9. STRUCTURAL CONTROLS - BEFORE ANY MAJOR GRADING ACTIVITIES, THE FOLLOWING BEST MANAGEMENT PRACTICES SHALL BE INSTALLED ON THE PROPOSED SITE - SILT FENCE, TEMPORARY TRACKING PAD, AND STORM SEWER INLET PROTECTION.

   (A) SILT FENCE - SILT FENCE IS A SYNTHETIC PERMEABLE WOVEN OR NON-WOVEN FABRIC TYPICALLY INCORPORATING WOODEN OR METAL SUPPORT STAKES AT INTERVALS SUFFICIENT TO SUPPORT THE FENCE, WATER, AND SEDIMENT RETAINED BY THE FENCE. SILT FENCE CAN ALSO BE INSTALLED WITH A WIRE FENCE BACKING. THE FENCE IS DESIGNED TO RETAIN SEDIMENT-LADEN WATER AND ALLOW SETTLEMENT OF SUSPENDED SOILS BEFORE THE STORM WATER FLOWS THROUGH THE FABRIC FOR DISCHARGE DOWNSTREAM. SILT FENCE SHALL BE LOCATED AS SHOWN ON THE PLAN SHEETS. THE SILT FENCE TO BE INCLUDED FOR THIS PROJECT SHALL BE CONSTRUCTED PER WISCONSIN DNR TECHNICAL STANDARDS FOR SILT FENCE (CODE 1056).

   (B) TEMPORARY TRACKING PAD - ALL ACCESS POINTS FROM THE PUBLIC STREET INTO THE CONSTRUCTION SITE SHALL INCLUDE A TRACKING PAD COMPOSED OF COURSE STONE TO THE DIMENSIONS SHOWN ON DETAIL SHEET (C201). ANY SEDIMENT REACHING A PUBLIC OR PRIVATE ROAD SHALL BE REMOVED BY STREET CLEANING (NOT FLUSHING) BEFORE THE END OF EACH WORKDAY.

   (C) STORM SEWER INLET PROTECTION - CURB AND GRATED INLETS ARE PROTECTED FROM THE INTRUSION OF SILT AND SEDIMENT THROUGH A VARIETY OF SEDIMENT CONTROL PRACTICES TO ALLOW SETTLEMENT OF SUSPENDED SOILS BEFORE DISCHARGING INTO THE STORM SEWER. GRATED INLETS TYPICALLY INCLUDE A STURDY FRAME WRAPPED IN GEOTEXTILE FABRIC OR SEDIMENT LOG PERIMETER TO SLOW THE FLOW OF WATER AND ALLOW PONDING WHERE SEDIMENT MAY SETTLE OUT. CURB INLETS TYPICALLY INCLUDE SEDIMENT LOG BARRIERS HELD IN PLACE WITH GEOTEXTILE FABRIC. OTHER MANUFACTURED PRODUCTS ARE ALSO AVAILABLE. ALL STORM DRAINS SHALL BE PROTECTED BY USING STRAW BALES, SEDIMENT LOGS, FABRIC, OR EQUIVALENT BARRIER.

   FINAL SITE STABILIZATION IS ACHIEVED WHEN TURF GRASS COVER PROVIDES PERMANENT STABILIZATION FOR AT LEAST 70 PERCENT OF THE DISTURBED SOIL SURFACE, EXCLUSIVE OF AREAS THAT HAVE BEEN PAVED.
10. OTHER POLLUTANT CONTROLS

    (A) DUST CONTROL - CONSTRUCTION TRAFFIC MUST ENTER AND EXIT THE SITE AT THE STABILIZED CONSTRUCTION EXIT. THE PURPOSE IS TO TRAP DUST AND MUD THAT WOULD OTHERWISE BE CARRIED OFF-SITE BY CONSTRUCTION EQUIPMENT.

    WATER TRUCKS OR OTHER DUST CONTROL AGENTS WILL BE USED AS NEEDED DURING CONSTRUCTION TO REDUCE DUST GENERATED ON THE SITE. DUST CONTROL MUST BE PROVIDED BY THE GENERAL CONTRACTOR TO A DEGREE THAT IS ACCEPTABLE TO THE OWNER'S CONSTRUCTION MANAGER, AND IN COMPLIANCE WITH APPLICABLE LOCAL AND STATE DUST CONTROL REGULATIONS. AFTER CONSTRUCTION, THE SITE WILL BE STABILIZED (AS DESCRIBED ELSEWHERE), WHICH WILL REDUCE THE POTENTIAL FOR DUST GENERATION.

    (B) SOLID WASTE DISPOSAL - NO SOLID MATERIALS, INCLUDING BUILDING MATERIALS, ARE ALLOWED TO BE DISCHARGED FROM THE SITE WITH STORM WATER. ALL SOLID WASTE, INCLUDING DISPOSABLE MATERIALS INCIDENTAL TO THE MAJOR CONSTRUCTION ACTIVITIES, MUST BE COLLECTED AND PLACED IN CONTAINERS. THE CONTAINERS WILL BE EMPTIED AS NECESSARY BY A CONTRACT TRASH DISPOSAL SERVICE AND HAULED AWAY FROM THE SITE. THE LOCATION OF SOLID WASTE RECEPTACLES SHALL BE SHOWN AND APPROVED BY THE OWNER.

    SUBSTANCES THAT HAVE THE POTENTIAL FOR POLLUTING SURFACE AND/OR GROUNDWATER MUST BE CONTROLLED BY WHATEVER MEANS NECESSARY IN ORDER TO ENSURE THAT THEY DO NOT DISCHARGE FROM THE SITE. FOR EXAMPLE, SPECIAL CARE MUST BE EXERCISED DURING EQUIPMENT FUELING AND SERVICING OPERATIONS. IF A SPILL OCCURS, IT MUST BE CONTAINED AND DISPOSED SO THAT IT WILL NOT FLOW FROM THE SITE OR ENTER GROUNDWATER, EVEN IF THIS REQUIRES REMOVAL, TREATMENT, AND DISPOSAL OF SOIL. IN THIS REGARD, POTENTIALLY POLLUTING SUBSTANCES SHOULD BE HANDLED IN A MANNER CONSISTENT WITH THE IMPACT THEY REPRESENT.

    (C) SANITARY FACILITIES - ALL PERSONNEL INVOLVED WITH CONSTRUCTION ACTIVITIES MUST COMPLY WITH STATE AND LOCAL SANITARY OR SEPTIC SYSTEM REGULATIONS. TEMPORARY SANITARY FACILITIES MUST BE PROVIDED AT THE SITE THROUGHOUT THE CONSTRUCTION PHASE. THEY MUST BE UTILIZED BY ALL CONSTRUCTION PERSONNEL AND MUST BE SERVICED BY A COMMERCIAL OPERATOR.

    (D) WATER SOURCE - NON-STORM WATER COMPONENTS OF SITE DISCHARGE MUST BE CLEAN WATER. WATER USED FOR CONSTRUCTION WHICH DISCHARGES FROM THE SITE MUST ORIGINATE FROM A PUBLIC WATER SUPPLIER, OR PRIVATE WELL APPROVED BY THE STATE HEALTH DEPARTMENT. WATER USED FOR CONSTRUCTION THAT DOES NOT ORIGINATE FROM AN APPROVED PUBLIC SUPPLY MUST NOT DISCHARGE FROM THE SITE. IT CAN BE RETAINED IN THE PONDS UNTIL IT INFILTRATES AND EVAPORATES.

    (E) CONCRETE WASTE FROM CONCRETE READY-MIX TRUCKS - DISCHARGE OF EXCESS OR WASTE CONCRETE AND/OR WASH WATER FROM CONCRETE TRUCKS WILL BE ALLOWED ON THE CONSTRUCTION SITE, BUT ONLY IN SPECIFICALLY DESIGNATED DIKED AREAS PREPARED TO PREVENT CONTACT BETWEEN THE CONCRETE AND/OR WASH WATER AND STORM WATER THAT WILL BE DISCHARGED FROM THE SITE. ALTERNATIVELY, WASTE CONCRETE CAN BE PLACED INTO FORMS TO MAKE RIP-RAP OR OTHER USEFUL CONCRETE PRODUCTS. THE CURED RESIDUE FROM THE CONCRETE WASHOUT DIKED AREAS SHALL BE DISPOSED IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS. THE JOB SITE SUPERINTENDENT IS RESPONSIBLE FOR ASSURING THAT THESE PROCEDURES ARE FOLLOWED.

    (F) FUEL TANKS - TEMPORARY ON-SITE FUEL TANKS FOR CONSTRUCTION VEHICLES SHALL MEET ALL STATE AND FEDERAL REGULATIONS. TANKS SHALL HAVE APPROVED SPILL CONTAINMENT WITH THE CAPACITY REQUIRED BY THE APPLICABLE REGULATIONS. THE TANK SHALL BE IN SOUND CONDITION FREE OF RUST OR OTHER DAMAGE WHICH MIGHT COMPROMISE CONTAINMENT. HOSES, VALVES, FITTINGS, CAPS, FILLER NOZZLES, AND ASSOCIATED HARDWARE SHALL BE MAINTAINED IN PROPER WORKING CONDITION AT ALL TIMES.
11. MINIMIZING EROSION AND RUNOFF DURING TRENCH OPERATIONS

    (A) EXCAVATED TRENCH MATERIALS SHALL BE PLACED ON THE UPPER SIDE OF THE TRENCH WHILE THE TRENCH IS OPEN.

    (B) EXCAVATED TRENCH MATERIAL, UPON COMPLETING WORK IN TRENCH, SHALL BE PLACED BACK IN THE TRENCH OR HAULED AWAY TO A PROPER SPOIL SITE. THE TRENCH SHALL BE BACKFILLED AND STABILIZED AT THE END OF EACH WORKING DAY.

ENGINEER:
DELTA 3
EVERY ANGLE COVERED
PROFESSIONAL CIVIL, MUNICIPAL & STRUCTURAL ENGINEERING
GRANT WRITING • LAND DEVELOPMENT • PLANNING & CADD SERVICES
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PLATTEVILLE, WISCONSIN 53818
886 JACKSON STREET PHONE: (563) 542-8005
DUBUQUE, IOWA 52001

FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:

MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

PROPOSED 2024 STREAM IMPROVEMENTS - MORREY CREEK

AVOCA, WISCONSIN

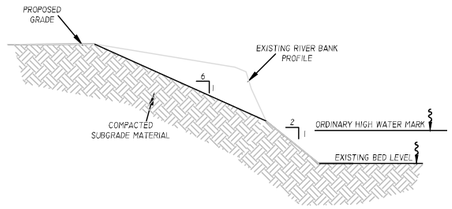
PROJECT LOCATION: MORREY CREEK
OWNER: VILLAGE OF AVOCA, 401 WISCONSIN STREET, AVOCA, WI 53506

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
--/--/----		-.-----

AGENCY REVIEW	
PROJECT NUMBER	D22-209
SHEET SCALE	NOT TO SCALE
DRAWN BY	C. COYIER
DATE ISSUED	AUG. 9, 2024
SHEET DESC.	DETAILS - EROSION CONTROL & NOTES

SHEET TITLE:
C201

SHEET NUMBER # 5 of 6

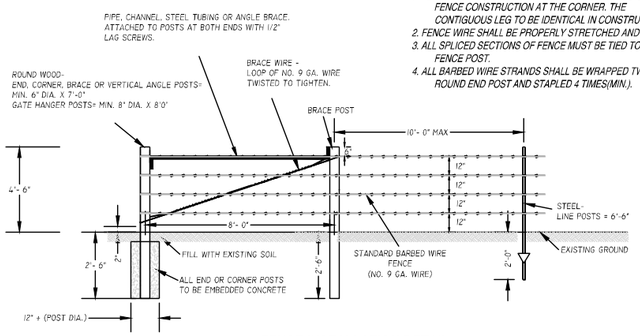


STREAM BANK GRADING (6:1 SLOPES) DETAIL

SCALE: N.T.S.

NOTE:

1. *FENCE DETAIL (AS ILLUSTRATED) SHOWS ONE LEG OF FENCE CONSTRUCTION AT THE CORNER. THE CONTIGUOUS LEG TO BE IDENTICAL IN CONSTRUCTION.*
2. *FENCE WIRE SHALL BE PROPERLY STRETCHED AND TIED.*
3. *ALL SPLICED SECTIONS OF FENCE MUST BE TIED TO A FENCE POST.*
4. *ALL BARBED WIRE STRANDS SHALL BE WRAPPED TWICE ROUND END POST AND STAPLED 4 TIMES(MIN.).*



FENCE INSTALLATION DETAIL

SCALE: N.T.S.

ENGINEER:

DELTA 3
EVERY ANGLE COVERED

PROFESSIONAL CIVIL, MUNICIPAL, & STRUCTURAL ENGINEERING
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FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:

MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

PROPOSED 2024 STREAM IMPROVEMENTS - MORREY CREEK

AVOCA, WISCONSIN

PROJECT LOCATION: MORREY CREEK

OWNER: VILLAGE OF AVOCA; 401 WISCONSIN STREET, AVOCA, WI 53506

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
--/--/----		------

AGENCY REVIEW	
PROJECT NUMBER	D22-209
SHEET SCALE	NOT TO SCALE
DRAWN BY	C. COYIER
DATE ISSUED	AUG. 9, 2024
SHEET DESC.	DETAILS - STREAM BANK

SHEET TITLE:

C202

SHEET NUMBER # **6 of 6**

Attachment #13

SECTION 029240

LANDSCAPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Preparation of subsoil.
2. Placing topsoil.
3. Seeding.
4. Mulching.
5. Fertilizing
6. Maintenance.
7. Removal and reinstallation of incidental items.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Temporary Seeding:
1. Basis of Measurement: Incidental to Landscaping.
2. Basis of Payment: Includes preparation of subsoil and topsoil, supply and placement of topsoil, fertilizing, seeding, mulching, watering and maintenance, and all equipment, tools, machinery, materials, labor, and construction means and methods to properly install Temporary Seeding.

B. Landscaping:
1. Basis of Measurement: By Lump Sum.
2. Basis of Payment: Includes preparation of subsoil and topsoil; supply and placement of topsoil, fertilizer, seeding, mulching, and erosion mat (if utilized); watering; maintenance; removal of erosion matting once seeding has established; removing and reinstalling or replacing (if disturbed), street signs, bushes, shrubs, retaining walls, wood bridges, fences, and decorative landscaping; removal, temporary relocating, and reinstallation or replacement of mailboxes (if disturbed); reprofiling existing ditches to achieve positive storm drainage; reinstallation of drain tile to finished grade; and all equipment, tools, machinery, materials, labor, and construction means and methods to properly install Landscaping.

1.3 DEFINITIONS

A. Weeds: Vegetative species other than specified species to be established in given area.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data for seed mix, fertilizer, and mulch.

1.5 QUALITY ASSURANCE

A. Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging.

B. Perform all work to the specifications herein. If an item is not clearly specified refer to the following sections in the Standard Specifications by the Wisconsin Department of Transportation:
   1. Section 625: Topsoil and Salvaged Topsoil
   2. Section 627: Mulching
   3. Section 629: Fertilizer and Agricultural Limestone
   4. Section 630: Seeding

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Product storage and handling requirements.

B. Deliver seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.7 MAINTENANCE SERVICE

A. Section 017000 - Execution Requirements: Requirements for maintenance service.

B. Maintain seeded areas immediately after placement until landscape is well established and exhibits vigorous growing condition.

PART 2 PRODUCTS

2.1 All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 TEMPORARY SEED MIXTURE

1. Use the following temporary seeding rates:

Species	lbs/acre	Percent Purity
Oats	131[1]	98
Cereal Rye	131[2]	97
Winter Wheat	131[2]	95
Annual Ryegrass	80[2]	98

[1] Spring and summer seeding
[2] Fall Seeding

2.3 PERMANENT SEED MIXTURE

A. For undeveloped areas, use seed mixture following the Bureau of Natural Heritage Conservation (BNHC) seed mixture as follows:
   1. Creeping Red Fescue: 5 lbs/acre.

2.	Side Oats Gramma:	1.0 lbs/acre.
3.	Black Eye Susan:	1.0 oz/acre.
4.	Purple Prairie Clover:	1.0 oz/acre.
5.	Bergamot	0.5 oz/acre.
6.	Companion Crop of Oats	0.5 bu/acre.

B. For maintained lawn areas, use seed mixture Number 40 as specified in the Standard Specifications by the Wisconsin Department of Transportation:

1.	Kentucky Bluegrass:	35 percent.
2.	Red Fescue:	20 percent.
3.	Hard Fescue:	20 percent.
4.	Improved Fine Perennial Ryegrass:	25 percent

2.4 SOIL MATERIALS

A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots. Material salvaged from site can be used if approved by the Engineer and Owner.

2.5 ACCESSORIES

A. Mulching Material: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are acceptable if approved of by Engineer.

B. Fertilizer: Commercial grade; recommended for grass; of proportion necessary to eliminate deficiencies of topsoil or to the following proportions: Nitrogen 20 percent, phosphoric acid 10 percent, and soluble potash 10 percent.

C. Water: Clean, fresh and free of substances or matter capable of inhibiting vigorous growth of vegetation.

D. Erosion Fabric: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed on two sides in a photodegradable plastic mesh. Netting must contain biodegradable thread with “leno” or “gauze” weave. Include manufacturer’s recommended steel wire staples, six (6) inches long. Provide North American Green S75BN, S150BN, SC150BN, C125BN, or pre-approved equal.

E. Stakes: Softwood lumber, chisel pointed.

F. String: Inorganic fiber.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify prepared soil base is ready to receive the Work of this section.

C. Conform all work to technical standard 1059, Seeding for Construction Site Erosion Control and with technical standard 1058, Mulching for Construction Sites, as published by the Wisconsin Department of Natural Resources.

3.2 PREPARATION OF SUBSOIL

A. Prepare sub-soil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated sub-soil.

C. Scarify subsoil to depth of six (6) inches where topsoil is to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted sub-soil.

3.3 PLACING TOPSOIL

A. Spread topsoil to minimum depth of six (6) inches over area to be seeded, unless otherwise noted on drawings. Rake until smooth.

B. Place topsoil during dry weather and on dry unfrozen subgrade.

C. Remove vegetative matter and foreign non-organic material from topsoil while spreading.

D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

E. Install edging at periphery of seeded areas in straight lines to consistent depth.

3.4 FERTILIZING

A. Apply fertilizer at application rate of 12 pounds per 1,000 square feet.

B. Apply after smooth raking of topsoil and prior to roller compaction.

C. Do not apply fertilizer at same time or with same machine used to apply seed.

D. Mix fertilizer thoroughly into upper two (2) inches of topsoil.

E. Lightly water soil to aid dissipation of fertilizer. Irrigate top level of soil uniformly.

3.5 SEEDING

A. Apply seed evenly in two intersecting directions. Rake in lightly.

B. Do not seed areas in excess of that which can be mulched on same day.

C. Planting Season: Areas after September 15 which fail to become established in the fall shall be re-seeded, re-fertilized, and re-mulched the following spring by June 1.

D. Do not sow immediately following rain, when ground is too dry, or when winds are over 12 mph.

E. Roll seeded area with roller not exceeding 112 lbs/linear foot.

F. Immediately following seeding and compacting, apply mulch to a loose thickness of one (1) - two (2) inches. Maintain clear of shrubs and trees.

G. Apply water with fine spray immediately after each area has been mulched. Saturate to four (4) inches of soil.

3.6 HYDROSEEDING

A. At the contractor's option: seed, fertilizer, and mulch may be applied by hydroseed method. Mix components in water using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application. Include nonasphaltic-tackifying agent in mixture.

B. Apply fertilizer, mulch and seeded slurry with hydraulic seeder at rate required to obtain specified seed sowing rate.

3.7 SEED PROTECTION

A. Cover seeded slopes where grade is four (4) inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.

B. Lay fabric smoothly on surface, bury top end of each section in six (6) inch deep excavated topsoil trench. Overlap edges and ends of adjacent rolls minimum 12 inches. Backfill trench and rake smooth, level with adjacent soil.

C. Secure outside edges and overlaps at 36-inch intervals with stakes.

D. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.

E. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum six (6) inches.

3.8 MAINTENANCE

A. Maintain seeded areas immediately after placement until landscape is well established and exhibits vigorous growing condition.

B. Water to prevent vegetation and soil from drying out. Minimum three (3) times required if dry conditions exist.

C. Control growth of weeds. Apply herbicides. Remedy damage resulting from improper use of herbicides.

D. Immediately reseed areas showing bare spots.

E. Repair washouts or gullies.

F. Protect seeded areas with warning signs during maintenance period.

END OF SECTION